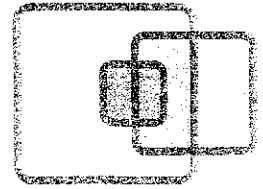


Test 1



Questions

1 A 34-year-old man presents with chest pain of 4 hours' duration, resolved at presentation. He has been smoking marijuana, which he obtained from an unknown source. His vital signs are 98.6°F, 115, 20, 167/95, 98% RA. His physical examination shows pupillary dilation, tachycardia, and diaphoretic skin. His electrocardiogram (EKG) shows ST depressions in V3-V5. Initial troponin level is 0.20 ng per mL. Which of the following is the most appropriate therapy at this time?

- (A) Percutaneous transluminal coronary angioplasty (PTCA)
- (B) Tissue plasminogen activator (tPA)
- (C) Abciximab
- (D) Metoprolol
- (E) Aspirin

2 A 29-year-old man is sent by the primary medical doctor's office for evaluation of his abnormal EKG. He is asymptomatic and his physical examination is normal. The EKG is shown in Figure 1-1. Which of the following is the most appropriate next step in management?

- (A) No acute therapy
- (B) Atropine 1 mg IV
- (C) Amiodarone 150 mg IV
- (D) Transcutaneous pacing
- (E) Synchronized cardioversion at 50 J

3 Which of the following opioids may predispose to QRS prolongation?

- (A) Fentanyl
- (B) Meperidine
- (C) Propoxyphene
- (D) Hydrocodone
- (E) Morphine

4 A 25-year-old woman presents to the emergency department (ED) with worsening left-sided pelvic pain and vaginal discharge. She states that she was seen in the office by her primary care doctor 3 days ago for similar problems and received an injection and was given a prescription that she has not had a chance to fill. On the phone, the office manager tells you the patient received an IM injection of ceftriaxone. In the ED, she has a fever, purulent

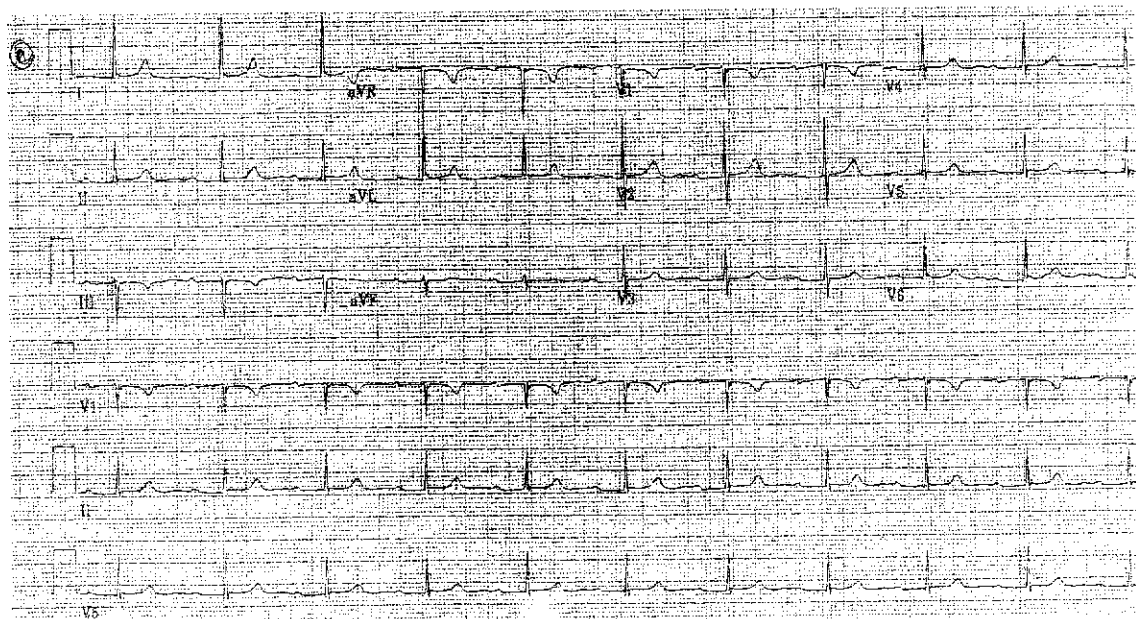


Figure 1-1. (See color insert.)



vaginal discharge, cervical motion tenderness, and a palpable, tender left-sided adnexal mass. Which of the following is true?

- (A) She has Fitz-Hugh-Curtis syndrome.
- (B) Aspiration and culture of the mass is likely to reveal *Neisseria gonorrhoeae*.
- (C) If untreated, rupture of the mass and secondary peritonitis may occur.
- (D) The patient should be kept NPO for emergent surgery.
- (E) The patient most likely has a hemorrhagic ovarian cyst.

- 5 A 65-year-old woman presents with 2 hours of acute abdominal pain. The pain is severe, diffuse, and progressively worsening. Blood pressure is 150/90, and abdominal examination demonstrates a palpable pulsatile mass. Abdominal computed tomography (CT) scan is shown in Figure 1-2. Which of the following is true regarding management of this patient?

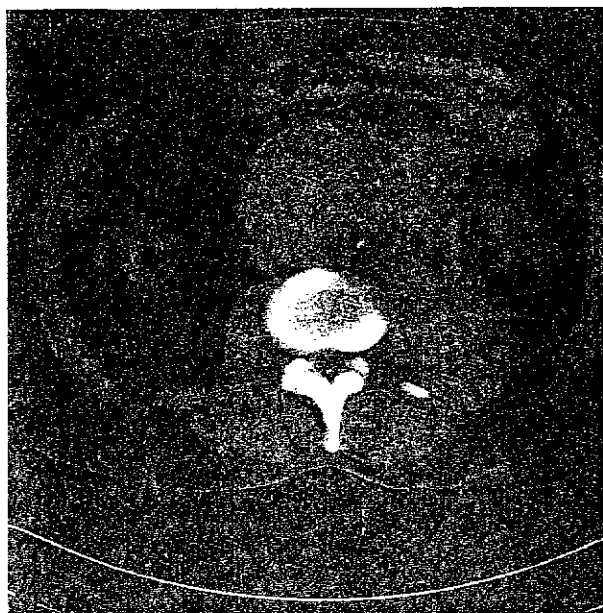


Figure 1-2.

- (A) Blood pressure should be reduced to systolic 100 mm Hg or below.
- (B) The patient should be crossmatched for 10 units of packed red blood cells.
- (C) Ultrasound may help better characterize the anatomy.
- (D) Angiogram may reduce the need for urgent surgery.
- (E) Hemodynamically stable patients with ruptured abdominal aortic aneurysms (AAAs) may be observed for signs of deterioration.

- 6 A 65-year-old man presents with complaint of double vision. On examination, covering either eye causes the diplopia to resolve. Which of the following is the most likely cause?

- (A) Multiple sclerosis
- (B) Thyroid disease
- (C) Isolated cranial nerve palsy
- (D) Myasthenia gravis
- (E) Orbital abscess

- 7 Which of the following is a negative symptom of schizophrenia?

- (A) Delusions
- (B) Hallucinations
- (C) Flat affect
- (D) Disorganized speech
- (E) Disorganized behavior

- 8 Which of the following is the most common cause of dilated cardiomyopathy?

- (A) Idiopathic
- (B) Systemic lupus erythematosus (SLE)
- (C) Tuberculosis (TB)
- (D) Cocaine
- (E) Familial

- 9 A 42-year-old man presents with pain, warmth, and swelling over his posterior elbow (see Fig. 1-3). The patient reports frequently having to lean on his elbow while performing electrical work as part of his job. Although he is able to flex and extend the joint, flexion results in increased pain. After aspiration and cell count of the fluid obtained, which of the following is the minimum WBC count suggestive of infection?

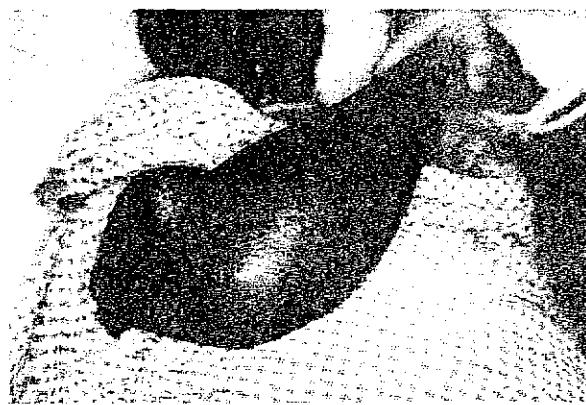


Figure 1-3.

- (A) White blood cell (WBC) > 500 per mm³
- (B) WBC > 1,000 per mm³

- (C) WBC >10,000 per mm³
- (D) WBC >50,000 per mm³
- (E) WBC >100,000 per mm³

10 Which of the following is the most effective treatment for lithium poisoning?

- (A) Activated charcoal
- (B) Sodium bicarbonate
- (C) Glucagon
- (D) Potassium chloride
- (E) Hemodialysis

11 Which of the following is the most appropriate initial antihypertensive medication for use in patients with severely elevated blood pressure and acute cardiac ischemia?

- (A) Nifedipine
- (B) Labetalol
- (C) Clonidine
- (D) Enalaprilat
- (E) Hydrochlorothiazide

12 A 22-year-old woman presents with a chief complaint of a painful vaginal lump and vulvar pain while walking (see Fig. 1-4). She denies any vaginal discharge, fevers, or abdominal pain. Her urine human chorionic gonadotropin (β -hCG) is negative. Which of the following is true?

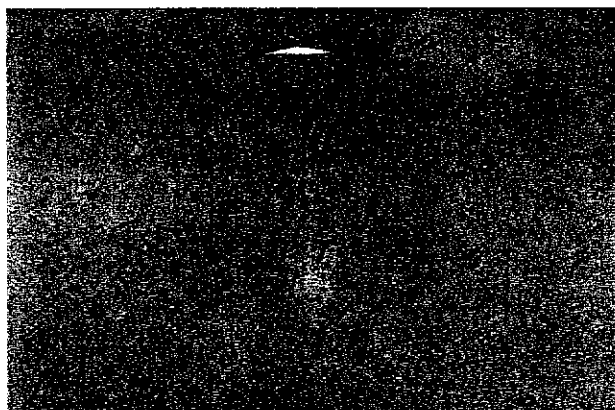


Figure 1-4.

- (A) *N. gonorrhoeae* and *Chlamydia trachomatis* cause most infections.

- (B) Antibiotics should be given to cover typical polymicrobial vaginal flora.
- (C) When not infected, this gland is palpable at the 5 o'clock and 7 o'clock positions around the vaginal introitus.
- (D) A Word catheter should be placed after incision and drainage and left in place for 6 to 8 weeks.
- (E) If left untreated, ascending cystitis, pyelonephritis and sepsis occurs in 35% of patients.

13 Which of the following findings should cast doubt on a diagnosis of Guillain-Barré syndrome (GBS)?

- (A) A patient who presents with symmetrical sensory loss but who has no motor weakness.
- (B) A patient with bilateral lower extremity weakness and paresthesias who has no reflexes in his lower or upper extremities.
- (C) A patient with bilateral lower extremity weakness, urinary retention, and a normal spinal magnetic resonance imaging (MRI).
- (D) A patient with a 2-day history of bilateral weakness and paresthesias of the feet who has a normal cerebrospinal fluid (CSF) examination.
- (E) None of the above.

14 Traumatic hyphema...

- (A) Is usually associated with an afferent pupillary defect.
- (B) Is treated with supine position and oculomotor exercises.
- (C) May require analgesic treatment with aspirin.
- (D) Can be complicated by re-bleeding.
- (E) Rarely requires specific management.

15 A 35-year-old marathon runner who is asymptomatic presents from an outside hospital with an "abnormal EKG." The EKG is shown in Figure 1-5. Your advice to the patient is

- (A) Telemetry admission for pacemaker.
- (B) Atropine 1 mg IV.
- (C) Amiodarone 300 mg IV.
- (D) Adenosine 6 mg IV.
- (E) No acute therapy, routine follow-up.

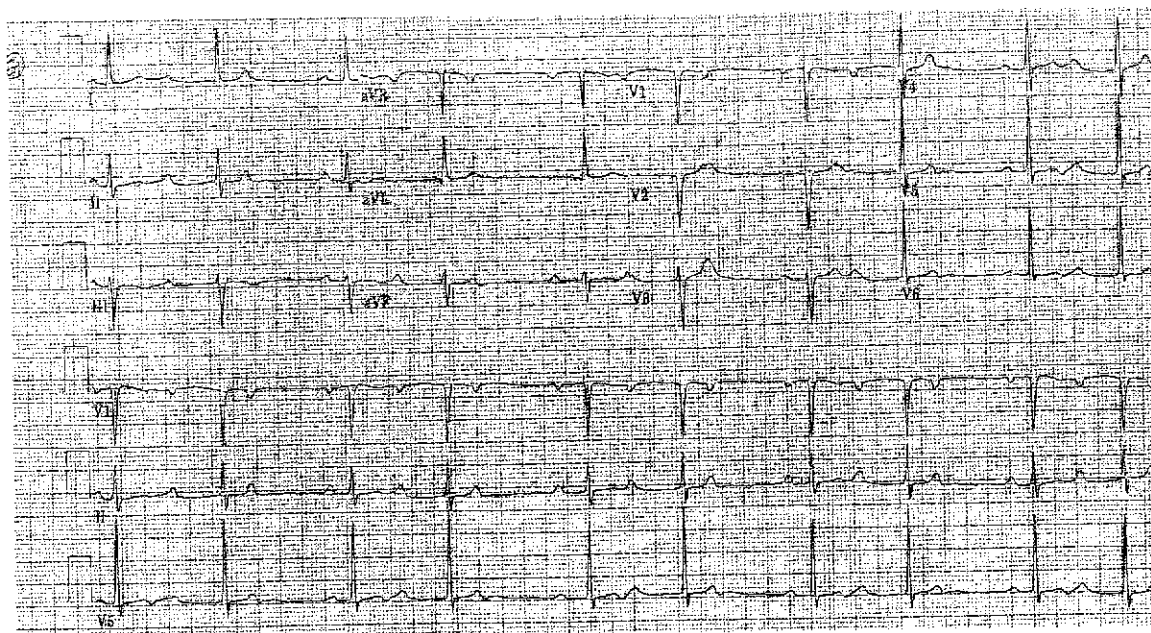


Figure 1-5. (See color insert.)

- 16** A 6-year-old child presents with seizure. She has had acute gastroenteritis for the past 2 days. Electrolytes are normal. Which of the following is the most likely cause?
- (A) *Salmonella*
 - (B) *Shigella*
 - (C) *Campylobacter*
 - (D) *Yersinia*
 - (E) *Vibrio*
- 17** Which of the following is a major Jones criterion for diagnosis of rheumatic fever?
- (A) Fever
 - (B) Sore throat
 - (C) Increased C-reactive protein (CRP)
 - (D) Sinus tachycardia
 - (E) Chorea
- 18** Which of the following is the most frequently affected structure in thoracic outlet syndrome?
- (A) Subclavian artery
 - (B) Subclavian vein
 - (C) Ulnar nerve
 - (D) Radial nerve
 - (E) Median nerve
- 19** Which of the following is the most common cause of multiple rib fractures in children?
- (A) Motor vehicle collision
 - (B) Child abuse
 - (C) Fall
 - (D) Sports injury
 - (E) Gunshot wound
- 20** Which of the following is true regarding ischemic heart disease?
- (A) It is the second leading cause of death in the United States.
 - (B) It is the second leading cause of death of women (after breast cancer).
 - (C) Recent reduction in mortality is partly related to decline in death from acute myocardial infarction (MI).
 - (D) Less than one fourth of all MIs occur in patients older than 65 years.
 - (E) Only 5% of sudden deaths from acute MI occur outside the hospital.
- 21** A 22-year-old diabetic man presents 1 day after obtaining a puncture wound to his left arm during a hiking accident. Since the accident, he has noted increasingly intense pain in his arm along with mild swelling and redness. On examination, his arm is noted to be mildly swollen and erythematous with an innocuous-appearing puncture wound on the volar aspect of his right forearm. His arm is extremely tender, although there is no crepitus. A plain film is obtained which reveals subcutaneous emphysema. Which of the following is the next best step in management?
- (A) Irrigation of the wound with sterile saline
 - (B) Surgical consult
 - (C) Incision and drainage in the ED
 - (D) CT scan of the arm
 - (E) MRI of the arm

22. A 15-year-old man is brought to the ED after being submerged in a lake for "a minute or two." He had been water skiing when he lost control and "wiped out" and then was lying face down in the water without moving. He was not breathing when his friends pulled him out of the water but he regained spontaneous respirations after they performed cardiopulmonary resuscitation (CPR). In the ED, he is somnolent, but breathing spontaneously with a pulse oximetry of 95% on room air and making purposeful movements. The next most important step in management is
- (A) IV antibiotics.
 - (B) Rapid sequence intubation.
 - (C) IV dexamethasone.
 - (D) Cervical spine films.
 - (E) ED thoracotomy.
23. Which of the following treatments has been shown to be effective in the prevention of acute mountain sickness (AMS)?
- (A) Propranolol
 - (B) Acetazolamide
 - (C) Furosemide
 - (D) Caffeine
 - (E) Nifedipine
24. Which of the following helps to differentiate a sympathomimetic crisis from an anticholinergic crisis?
- (A) Tachycardia
 - (B) Mydriasis
 - (C) Diaphoresis
 - (D) Seizures
 - (E) Altered mental status
25. A 28-year-old man presents with acute, progressively worsening headache and fever for 1 day. Physical examination reveals a toxic-appearing, slightly confused patient with fever and meningismus. Which of the following is the most appropriate next step in management?
- (A) CT brain without contrast
 - (B) CT brain with contrast
 - (C) Lumbar puncture
 - (D) Ceftriaxone
 - (E) Ceftriaxone and dexamethasone
26. Which of the following is the lowest acute toxic ingestion of acetaminophen requiring treatment with N-acetylcysteine (NAC) in the adult patient?
- (A) 5 g
 - (B) 7.5 g
 - (C) 15 g
 - (D) 50 g
 - (E) 100 g
27. Which of the following is a risk factor for pelvic inflammatory disease (PID)?
- (A) Age >35 years
 - (B) Smoking
 - (C) Cocaine use
 - (D) White race
 - (E) Tampon use
28. Which of the following is the best modality to diagnose posterior sternoclavicular dislocation?
- (A) Anteroposterior (AP) chest x-ray
 - (B) Lateral chest x-ray
 - (C) Anteroposterior clavicle x-ray
 - (D) CT chest
 - (E) Thoracic ultrasound
29. A 62-year-old woman with a history of O₂-dependent chronic obstructive pulmonary disease (COPD) presents to the ED with a chief complaint of dyspnea and increased cough productive of yellow phlegm. The patient uses 2 L of O₂ at home. When you enter the room to assess the patient, you find an ill-appearing, dyspneic woman speaking in sentence fragments. Her Po_x reads 85% and you note she is on 4 L of O₂ by nasal cannula. As you start to increase her O₂, you wonder if you are going to eliminate her respiratory drive. The next best step is to:
- (A) Immediately intubate the patient using rapid sequence intubation.
 - (B) Increase the O₂ to 6 L, because minute ventilation changes little in COPD patients exposed to higher levels of oxygen.
 - (C) Decrease the O₂ to 2 L (her baseline) in order to increase the patient's respiratory drive.
 - (D) Perform an arterial blood gas (ABG) to assess the patient's exact ventilatory and oxygenation status because you do not know what effect changing the oxygen will have.
 - (E) Leave the O₂ at 4 L because the patient is likely hypoxic at baseline and continue treatment hoping the patient will improve.
30. Which of the following is true regarding Lyme disease?
- (A) Incidence is highest in the San Joaquin Valley.
 - (B) The causative agent is a gram-negative bacillus.
 - (C) The most common neurologic sign is facial nerve palsy.
 - (D) Lyme meningitis is clinically indistinguishable from bacterial meningitis.
 - (E) First-line therapy is with clindamycin.

- 31 In a patient with benzodiazepine poisoning, which of the following is an indication for flumazenil use?
- (A) Accidental pediatric ingestion
 - (B) Co-ingestion of tricyclic antidepressant
 - (C) Chronic benzodiazepine user
 - (D) Alcoholic patient
 - (E) Seizure activity
- 32 A 26-year-old man develops headache, dizziness, and nausea while hiking at 10,000 ft. His destination is a cabin that is 500 ft higher. The cabin has a medical kit with acetazolamide and dexamethasone. Which of the following is the next best step?
- (A) Set up a tent and sleep at their current altitude for the night.
 - (B) Continue to the cabin for the medications.
 - (C) Descend 1,500 to 2,000 ft or until symptoms resolve.
 - (D) Stimulate the hypoxic ventilatory response with an energy drink.
 - (E) All of the options are reasonable.
- 33 A 27-year-old woman, G₂P₁, at 5 weeks by dates, presents with abdominal pain. She has had minor "spotting" but no frank vaginal bleeding, her internal cervical os is closed, and her serum β -hCG is 750 mIU per mL. Which of the following is true?
- (A) She should be diagnosed with a threatened abortion, and asked to return in 2 days for a repeat quantitative β -hCG level.
 - (B) She has a missed abortion.
 - (C) She should receive an ultrasound to assess uterine contents and the adnexa.
 - (D) She should be diagnosed with an early pregnancy versus an ectopic pregnancy and told to return in 2 days for a repeat quantitative β -hCG level and an ultrasound.
 - (E) She has an inevitable abortion.
- 34 Which of the following is the most commonly injured abdominal organ in pediatric blunt trauma?
- (A) Liver
 - (B) Spleen
 - (C) Kidney
 - (D) Small intestine
 - (E) Large intestine
- 35 A 45-year-old man presents with locking and clicking of his knee for several days. He twisted it several weeks ago and did not seek medical care at the time. Physical examination demonstrates no knee instability or patellar tenderness. His knee clicks with flexion and occasionally gets locked just before full extension. Which of the following is the most likely structure to be injured?
- (A) Anterior cruciate ligament (ACL)
 - (B) Posterior cruciate ligament (PCL)
 - (C) Medial meniscus
 - (D) Lateral meniscus
 - (E) Medial collateral ligament (MCL)
- 36 Which of the following is true regarding metacarpal neck fractures?
- (A) Fractures of the ring finger require more accurate alignment than fractures of the index finger.
 - (B) Rotational deformities are poorly tolerated and must be corrected.
 - (C) Fractures should be reduced with the finger in extension.
 - (D) Fractured digits can be buddy taped to their healthy neighbors.
 - (E) All of the above.
- 37 Which of the following statements about exercise-induced asthma (EIA) is correct?
- (A) Attacks during active exercise are common and prevent most of these patients from engaging in strenuous exertion.
 - (B) Recovery is usually slow and requires prolonged use of inhaled β_2 -agonists.
 - (C) Peak symptoms actually occur typically 5 to 10 minutes after exertion.
 - (D) Attacks occur more commonly in asthmatics who participate in summer sports than in winter sports.
 - (E) None of the above.
- 38 A 65-year-old woman presents to the emergency room (ER) with signs and symptoms of digitalis toxicity, ventricular tachycardia, and digoxin level of 8.5 ng per mL. She is treated with digitalis antibody fragment therapy and the cardiac rhythm is now sinus. A repeat digoxin level after the fragments are given is 12 ng per mL. Which of the following is the most appropriate next step in management?
- (A) No acute therapy
 - (B) Cardioversion at 50 J
 - (C) Procainamide 1 g IV
 - (D) Calcium chloride 1 g IV
 - (E) Potassium chloride 40 mEq IV
- 39 According to the current guidelines for tPA administration, which of the following represents the

- maximum blood pressure threshold for a patient to be eligible for tPA?
- (A) Systolic blood pressure (SBP) <185 and diastolic blood pressure (DBP) <110
 - (B) DBP <120
 - (C) Mean arterial pressure (MAP) <130
 - (D) SBP <220 and DBP <120
 - (E) SBP <140 and DBP <90
42. A 35-year-old man presents with severe head trauma. Fundoscopic examination demonstrates papilledema and increased intracranial pressure (ICP) and impending herniation is suspected. Mannitol is given and the decision is made to hyperventilate the patient to induce cerebral vasoconstriction and decrease blood volume. Which of the following is an appropriate target level of PCO_2 for therapeutic hyperventilation?
- (A) 22 mm Hg
 - (B) 27 mm Hg
 - (C) 32 mm Hg
 - (D) 37 mm Hg
 - (E) 42 mm Hg
43. Which of the following is true about systemic lupus erythematosus (SLE)?
- (A) Arthralgias and arthritis are typically asymmetrical.
 - (B) The classic malar rash is seen in only 40% to 50% of patients.
 - (C) Stroke is the most common neurologic manifestation.
 - (D) Libman-Sachs endocarditis is the most common cardiac manifestation.
 - (E) Drug-induced lupus is typically irreversible.
44. A 22-year-old woman presents in anticholinergic crisis. She is delirious, agitated, and requires sedation. Which of the following medications would be most appropriate to sedate this patient?
- (A) Thorazine
 - (B) Fluphenazine
 - (C) Lorazepam
 - (D) Etomidate
 - (E) Ketamine
45. Which of the following is most characteristic of complex regional pain syndrome (CRPS) (formerly known as *reflex sympathetic dystrophy*)?
- (A) Diminished pulse
 - (B) Prolonged capillary refill time
 - (C) Paralysis
 - (D) Diaphoresis
 - (E) Male predominance
46. A 33-year-old man presents with severe agitation, psychosis, and violent behavior. Physical examination demonstrates vertical nystagmus. Which of the following is the most likely drug ingested?
- (A) Cocaine
 - (B) Phencyclidine (PCP)
 - (C) Lysergic acid diethylamine (LSD)
 - (D) Heroin
 - (E) Methylene dioxymethamphetamine (MDMA)
47. A 65-year-old woman with history of diabetes and hypertension presents with chest pain for 5 hours. Physical examination demonstrates blood pressure of 100/55, jugular venous distension (JVD), and hepatomegaly. No crackles are noted. EKG demonstrates inferior ST depressions. You suspect the possibility of right ventricular infarction. You instruct the ED technician to place the rV_4 lead at:
- (A) Right fourth intercostal space, mid-clavicular line.
 - (B) Right fifth intercostal space, mid-clavicular line.
 - (C) Right sixth intercostal space, mid-clavicular line.
 - (D) Right fourth intercostal space, right sternal border.
 - (E) Right fifth intercostal space, right sternal border.
48. Which of the following is the most common form of botulism?
- (A) Food-borne
 - (B) Infant
 - (C) Wound
 - (D) Respiratory
 - (E) Cardiac
49. Which of the following is true regarding falls from buildings?
- (A) Mortality is unrelated to height of the fall.
 - (B) Feet-first falls cause retroperitoneal bleeding more often than intraperitoneal bleeding.
 - (C) Renal injury is uncommon in falls onto supine position.
 - (D) Calcaneal fracture is the most common cause of death from all falls.
 - (E) Falls onto prone position almost never result in death.
50. A 15-year-old boy comes to the ED complaining of shortness of breath and nausea. He admits to "huffing" glue before presentation. Which of the

following is the most appropriate therapy at this time?

- (A) Supportive care only
- (B) Antibiotics
- (C) Corticosteroids
- (D) Diuretics
- (E) Activated charcoal

- 49** A 72-year-old man presents to the ED with a bump on his nose (see Fig. 1-6). He denies any pain associated with the lesion but has noticed that it has been growing over the last several months. Which of the following is the most likely diagnosis?

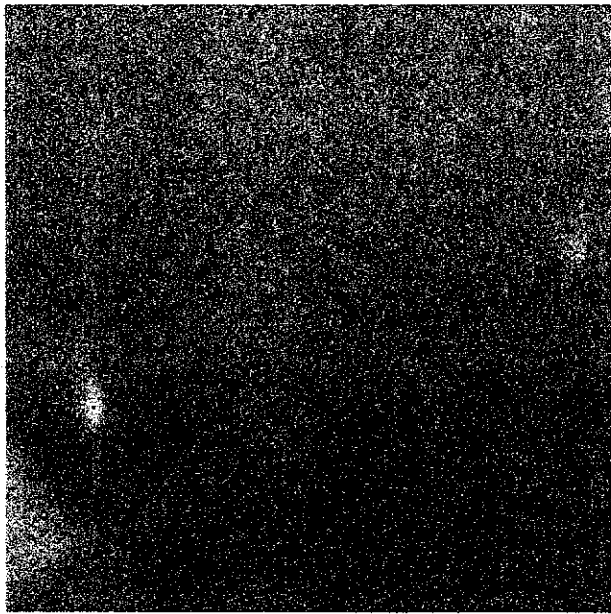


Figure 1-6.

- (A) Basal cell carcinoma (BCC)
 - (B) Melanoma
 - (C) Kaposi's sarcoma
 - (D) Mycosis fungoides
 - (E) Squamous cell carcinoma (SCC)
- 50** Which of the following is the most common cause of seizures in a term newborn?
- (A) Hypoxia
 - (B) Hydrocephalus
 - (C) Intracranial hemorrhage
 - (D) Idiopathic
 - (E) Hypoglycemia
- 51** A 44-year-old woman presents after a motor vehicle collision with a complaint of neck pain. Neurologic examination reveals that bilateral upper extremity

strength is 1/5 and bilateral lower extremity strength is 4/5. Which of the following is the most likely pathophysiologic process?

- (A) Anterior cord syndrome
- (B) Central cord syndrome
- (C) Brown-Séquard syndrome
- (D) Cauda equina syndrome
- (E) Complete cord injury

- 52** A 30-year-old, 80-kg male patient who presented to your ED with an acute asthma exacerbation is not responding to optimal therapy. You decide to treat him with epinephrine. The appropriate dose is

- (A) 0.3 mL 1:10,000 SQ.
- (B) 0.5 mL 1:10,000 SQ.
- (C) 0.3 mL 1:1,000 SQ.
- (D) 0.5 mL 1:1,000 IV.
- (E) 0.3 mL 1:10,000 IM.

- 53** A 33-year-old woman presents with a chief complaint of dysphagia. She feels a sensation of foods, particularly solids, getting "stuck" in her chest and she sometimes needs to raise her arms above her head or straighten her back after eating to help things pass. She also complains of intermittent substernal burning chest pain. Her doctor has been treating her for gastroesophageal reflux disease (GERD) for the last 9 months but she seems to be getting worse. What is the likely cause of her symptoms?

- (A) Nutcracker esophagus
- (B) Diffuse esophageal spasm
- (C) Schatzki's ring
- (D) Achalasia
- (E) Zenker diverticulum

- 54** A 45-year-old man presents with signs and symptoms of bacterial meningitis. Which of the following is the single most likely cause?

- (A) Group B streptococcus
- (B) *Listeria monocytogenes*
- (C) *Streptococcus pneumoniae*
- (D) *Neisseria meningitidis*
- (E) *Hemophilus influenzae*

- 55** Which of the following is true regarding status epilepticus?

- (A) Children younger than 16 years have the highest mortality due to status epilepticus.
- (B) Treatment with diazepam has better outcomes than with lorazepam.
- (C) The most common side effect of benzodiazepines given for status epilepticus is hypoventilation.

- (D) Among adults, the most common etiology of status epilepticus is subtherapeutic antiepileptic drug levels.
- (E) None of the above is true.
- 55 Which of the following is true regarding aortic dissection?
- (A) Dyspnea is the most common symptom.
- (B) Syncope often indicates pericardial effusion and tamponade.
- (C) Aortic regurgitation occurs in most cases.
- (D) Dissection into coronary arteries occurs most often in the left coronary artery.
- (E) Interarm differences in SBP of > 20 mm Hg occur in most patients.
- 56 A 53-year-old man with hypertension presents with a 2-month history of back pain and difficulty urinating. His prostate is normal on examination, but you appreciate mildly decreased strength in his lower extremities bilaterally. While waiting for an MRI to investigate the cause of his suspected epidural spinal cord compression, you order a postvoid residual to be checked in the interim. Which of the following is the upper limit for a normal postvoid residual in this patient?
- (A) 15 mL.
- (B) 50 mL.
- (C) 100 mL.
- (D) 150 mL.
- (E) 200 mL.
- 58 Which of the following is the most common side effect of dihydroergotamine (DHE), used in the treatment of acute migraine headache?
- (A) Diarrhea
- (B) Flushing
- (C) Shortness of breath
- (D) Nausea
- (E) Chest pain
- 59 A 43-year-old woman with a history of a renal transplant presents with fever, headache, and purulent rhinorrhea. On examination she is found to have blackened nasal mucosa. Which of the following is the likely cause of her illness?
- (A) *Rhizopus* spp. (Mucormycosis)
- (B) *Coccidioides immitis*
- (C) *Histoplasma capsulatum*
- (D) *Blastomyces dermatitidis*
- (E) *Cryptococcus neoformans*
- 60 Which of the following represents the major route of metabolism for acetaminophen?
- (A) Glucuronidation
- (B) Sulfation
- (C) Cytochrome P-450 oxidation
- (D) Direct renal excretion
- (E) Plasma breakdown
- 61 Of the following, which is the most common cause of true pediatric hemoptysis?
- (A) Mycobacterium TB infection
- (B) Lung cancer
- (C) Goodpasture's syndrome
- (D) Congenital heart disease
- (E) Cystic fibrosis
- 62 Which of the following is true about acute diarrheal illnesses due to *Shigella* spp.?
- (A) Antimotility agents such as diphenoxylate are useful as monotherapy in patients with Shigellosis.
- (B) Infection with *Shigella* spp. requires an unusually large inoculum.
- (C) Colicky abdominal pain with high fever and diarrhea is the most common presentation.
- (D) The treatment of choice is trimethoprim-sulfamethoxazole.
- (E) Fecal leukocytes are only rarely detected in patients with Shigellosis.
- 63 A 22-year-old man presents with cough, fever, and shortness of breath for 3 days. He has no past medical history. His vital signs are: 100.5°F, 92, 22, 122/72, 98% RA. Examination reveals left lower lung field crackles that do not clear on coughing. Which of the following is the most appropriate therapy?
- (A) Doxycycline PO
- (B) Linezolid PO
- (C) Cephalexin PO
- (D) Clindamycin PO
- (E) Piperacillin-tazobactam IV
- 64 In patients with measles, where are Koplik's spots most likely to be seen?
- (A) Hard palate
- (B) Soft palate
- (C) Tonsils
- (D) Tongue
- (E) Buccal mucosa
- 65 A 26-year-old previously healthy man is brought to the ED after being found unconscious outside a bar after having vomited on himself. He is drunk and afebrile, and his pulse oximetry reveals a saturation of 96%. His chest x-ray is shown in Figure 1-7. Which of the following is true?

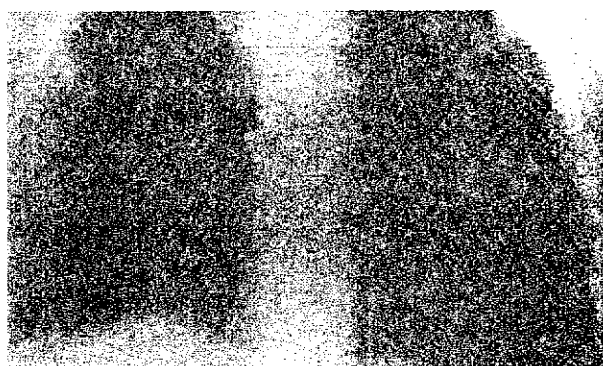


Figure 1-7.

- (A) The patient likely has a developing bacterial pneumonia and requires broad spectrum antibiotics.
- (B) The patient likely has a chemical pneumonitis caused by the aspiration of acidic gastric contents, which may later develop into pneumonia.
- (C) Antibiotics should be started early in chemical pneumonitis to prevent the subsequent development of bacterial superinfection.
- (D) Corticosteroids have been proved to be beneficial in patients such as these.
- (E) This patient is probably suffering from a combination of chemical pneumonitis and bacterial infection.
- 65** A 24-year-old man presented to the ED with an acute asthma exacerbation that was refractory to optimal treatment. A few minutes after intubating him, the resuscitation nurse tells you that the patient is waking up and "fighting the vent." You realize that the drugs you used for rapid sequence intubation are wearing off. Your best initial course of action is to:
- (A) Paralyze the patient with *cis*-atracurium to ensure that he "synchronizes" with the vent.
- (B) Give the patient a bolus of IV midazolam and place the patient on a midazolam drip.
- (C) Re-induce the patient with ketamine, at a dose of 1.5 mg per kg.
- (D) Paralyze the patient with succinylcholine to ensure that he "synchronizes" with the vent.
- (E) Check a stat metabolic panel to ensure the patient is not hyperkalemic.
- 66** A 25-year-old man with history of acute myelogenous leukemia (AML) presents with acute onset of generalized weakness. He received his first dose of chemotherapy 3 days before. Which of the following is the most likely abnormality on laboratory analysis?
- (A) Hyperkalemia
- (B) Hypercalcemia
- (C) Hypophosphatemia
- (D) Hyponatremia
- (E) Hypomagnesemia
- 67** Which of the following are common findings in patients diagnosed with pneumocystis carinii pneumonia?
- (A) Elevated transaminases (aspartate aminotransferase [AST], alanine transaminase [ALT])
- (B) Respiratory acidosis due to CO₂ retention
- (C) Pleural effusions
- (D) Elevated arterial lactate levels
- (E) Elevated lactate dehydrogenase (LDH) levels
- 68** Which of the following rashes is characterized by a positive Nikolsky's sign?
- (A) Roseola infantum
- (B) Bullous impetigo
- (C) Pemphigus vulgaris
- (D) Tinea corporis
- (E) Erysipelas
- 69** A mother brings in her 4-year-old daughter complaining of persistent perianal pruritus. The symptoms are worse at night and the mother has had to cut her daughter's nails short because she was scratching and irritating her skin. Which of the following is true?
- (A) The most sensitive test is a stool sample for ova and parasites.
- (B) The organism responsible for these symptoms can occasionally cause urinary tract infections and even vulvovaginitis.
- (C) The infection is most commonly acquired by ingestion of contaminated food or water.
- (D) Metronidazole is the antibiotic of choice.
- (E) Eosinophilia is commonly associated with her condition.
- 70** Physical examination of a patient with Reiter's syndrome may be expected to reveal:
- (A) Waxy plaques on the palms and soles
- (B) Sausage-like swelling of the fingers
- (C) Painful, shallow ulcers in the mouth
- (D) Iritis
- (E) All of the above
- 71** The most specific finding for carpal tunnel syndrome (CTS) is
- (A) Normal sensation on the medial side but abnormal sensation on the lateral side of the ring finger.
- (B) Weakness of thumb opposition.

- (C) Abnormal sensation of the distal palmar tip of the index finger.
- (D) The presence of a positive Tinel's sign.
- (E) Lumbrical weakness.
- 73 A 20-year-old man presents to the ED with several days of progressive chest pain, fatigue, myalgias, and exertional dyspnea. He states that he had the "flu" 1 week before. He denies any illicit drug use or family history of heart disease. Physical examination reveals temperature of 100.5°F, heart rate of 125, no murmurs on cardiac examination, and scattered bilateral crackles on lung examination. EKG demonstrates sinus tachycardia, chest x-ray reveals cardiomegaly and mild pulmonary edema, and laboratory reports are normal except for troponin I, which is elevated at 10 ng per mL. Which of the following is the most likely etiology?
- (A) MI
- (B) Aortic dissection
- (C) Viral infection
- (D) Stroke
- (E) Diabetic ketoacidosis
- 74 Which of the following is true regarding interpersonal violence and intimate partner abuse (IPA)?
- (A) Most violence against women is perpetrated by strangers.
- (B) Most of the violence against men is perpetrated by intimate partners.
- (C) Less than 1% of all men report an incident of IPA.
- (D) Victim substance abuse contributes to IPA.
- (E) Most patients will not report IPA unless directly asked.
- 75 Which of the following patients has the highest statistical chance of completed suicide?
- (A) 75-year-old black man
- (B) 75-year-old white man
- (C) 18-year-old black woman
- (D) 35-year-old pregnant woman
- (E) 50-year-old married white man
- 76 Which of the following tissues has the greatest resistance to electrical flow?
- (A) Nerves
- (B) Blood
- (C) Fat
- (D) Skin
- (E) Muscle
- 77 A 23-year-old woman presents with shortness of breath. She is postpartum day 3 after a term, normal spontaneous vaginal delivery. She describes bilateral leg swelling, orthopnea, and cough with frothy sputum. She denies chest pain. Physical examination demonstrates presence of an S3, bilateral pulmonary crackles, and pitting edema of her lower extremities. Which of the following is true regarding this condition?
- (A) Cardiac catheterization is the next step in management.
- (B) It occurs in approximately 10% of all pregnancies.
- (C) Patients who survive do not develop the condition in subsequent pregnancies.
- (D) Mortality is as high as 30%.
- (E) Aspirin is the mainstay of therapy.
- 78 A 15-year-old girl is brought by her parents because her parents suspect her of drug use. In the absence of her parents, the patient states that she was at a rave party the previous night and took a pill to help her "feel closer" to her friends. Which of the following is the most likely drug used?
- (A) Lysergic acid diethylamine (LSD)
- (B) PCP
- (C) 3, 4-methylenedioxymethamphetamine
- (D) Sertraline
- (E) Phenelzine
- 79 A 55-year-old man presents with pelvic pain after a motor vehicle crash. His primary survey is intact and vital signs are normal, but careful pelvic examination demonstrates a fractured pelvis with a fragment jutting through the rectal mucosa. Which of the following is the most appropriate definitive management?
- (A) Operative repair
- (B) Angiography with embolization
- (C) Bedside irrigation
- (D) Bedside rectal suturing
- (E) Foley catheter placement
- 80 Which of the following is the most common risk factor in the development of a gastric ulcer?
- (A) Aspirin or nonsteroidal anti-inflammatory drug (NSAID) use
- (B) Cigarette smoking
- (C) Alcohol abuse
- (D) Shock states
- (E) *Helicobacter pylori* infection
- 81 Patients with spinal stenosis:
- (A) Most commonly present with a radiculopathy that is worse with walking.
- (B) Typically feel relief when leaning forward.

- (C) Often have a lumbar radiculopathy at several levels.
- (D) May be able to walk uphill more easily than downhill.
- (E) All of the above.

82 A 54-year-old diabetic woman presents with perineal pain, fever, and lethargy. Her perineal examination is shown in Figure 1-8. Which of the following is the most appropriate next step in management?



Figure 1-8.

- (A) Corticosteroids
- (B) Oral antibiotics
- (C) Intravenous antibiotics
- (D) Intravenous antibiotics and surgical debridement
- (E) MRI pelvis

83 Which of the following is true regarding the afterdrop phenomenon in hypothermic patients?

- (A) Afterdrop predisposes patients to the development of ventricular fibrillation.
- (B) Afterdrop is exacerbated by active external rewarming.
- (C) Afterdrop is caused by the return of cold peripheral blood to the core upon rewarming.
- (D) Afterdrop results from a paradoxical slowing of metabolism during rewarming.
- (E) Afterdrop has not been shown to be of any clinical importance.

84 A 34-year-old man overdoses on bupropion. Which of the following serious sequelae is most likely?

- (A) Coma
- (B) Seizure
- (C) Torsade de pointes
- (D) Hypotension
- (E) Hypertension

85 Which of the following neurologic functions is commonly impaired in patients with anterior cord syndromes?

- (A) Vibration sensation
- (B) Fine touch sensation
- (C) Temperature sensation
- (D) Position sensation
- (E) Extraocular motor function

86 A 23-year-old woman presents with fever, myalgias, and headache for 3 days. She then developed a rash, which started on her wrists and ankles and has now spread all over her body. The nonblanching rash is shown in Figure 1-9. Which of the following is the most likely etiology?



Figure 1-9.

- (A) *Rickettsia rickettsii*
- (B) *Borrelia burgdorferi*
- (C) Coxsackievirus
- (D) *N. gonorrhoeae*
- (E) *N. meningitidis*

- 87 A 35-year-old woman presents after a fall from the fourth-story window. She was initially awake and moaning, but then becomes unresponsive. Her pupils are both initially pinpoint and progress to midpoint with loss of light reflex. She exhibits decorticate posturing in response to pain and hyperventilation. You suspect cerebral herniation. Which of the following is the most likely mechanism?
- (A) Uncal
 - (B) Central transtentorial
 - (C) Upward transtentorial
 - (D) Cerebellotonsillar
 - (E) Medullary
- 88 An 85-year-old man without any past medical history presents to the ED with a fall from standing height with accompanying head trauma. A CT scan of the brain is ordered. Which of the following is the most likely abnormal finding on CT scan?
- (A) Epidural hematoma
 - (B) Subdural hematoma
 - (C) Subarachnoid hemorrhage
 - (D) Cerebral contusion
 - (E) Cerebellar hematoma
- 89 Which of the following is an indication for replantation after amputation?
- (A) Amputation of the thumb in the nondominant hand.
 - (B) Ring finger amputation distal to the distal interphalangeal joint (DIP) joint.
 - (C) A 58-year-old diabetic factory worker with an amputation of his index finger at the metacarpophalangeal (MCP) joint.
 - (D) A 23-year-old laboratory worker with a middle finger amputation at the level of his middle phalanx who stored his finger packed in dry ice for the last 12 hours.
 - (E) All of the above.
- 90 Which of the following is the most common mode of completed suicide?
- (A) Drug ingestion
 - (B) Firearms
 - (C) Carbon monoxide
 - (D) Hanging
 - (E) Wrist cutting
- 91 Which of the following is the appropriate initial treatment for a patient who becomes hypotensive after receiving nitroglycerin?
- (A) IV fluids
 - (B) Dopamine
 - (C) Dobutamine
 - (D) Norepinephrine
 - (E) Amrinone
- 92 A 34-year-old woman with acquired immune deficiency syndrome (AIDS) presents with first-time seizure. Which of the following is the most likely cause of her seizure?
- (A) Mass lesion
 - (B) Meningitis
 - (C) Stroke
 - (D) Electrolyte abnormality
 - (E) Syphilis
- 93 Which of the following represents the major pharmacologic action of low molecular weight heparins?
- (A) Direct platelet inhibitor
 - (B) Factor II (thrombin) inhibitor
 - (C) Factor X_a inhibitor
 - (D) von Willebrand factor inhibitor
 - (E) Factor XIII inhibitor
- 94 Which of the following is true regarding Guillain-Barré syndrome (GBS)?
- (A) The clinical course is more severe in the elderly.
 - (B) Patients with a rapid onset are more likely to have a benign recovery.
 - (C) Patients with preceding gastroenteritis caused by *Campylobacter jejuni* have a more benign course.
 - (D) Autonomic involvement, such as urine retention, ileus, sinus tachycardia, and postural hypotension is uncommon in GBS.
 - (E) Respiratory failure requiring mechanical ventilation eventually occurs in 75% of patients.
- 95 Which of the following is a unique aspect of tarantulas?
- (A) Their abdominal hairs can become embedded in the skin resulting in subsequent allergic reactions.
 - (B) In addition to venom, they serve as a vector for *Borrelia* spp. and may transmit Lyme disease.
 - (C) Their venom triggers widespread mast cell degranulation resulting in diffuse flushing and pruritus.
 - (D) Tarantula envenomation may result in anaphylaxis and rapid respiratory failure.
 - (E) Envenomation of an extremity can cause transient paralysis distal to the wound.
- 96 A 21-year-old woman presents to the ED for a "recheck" of her β -hCG level. She was seen by a colleague in your ED 2 days ago after presenting with crampy low abdominal pain and vaginal spotting.

Her β -hCG level at that time was 1,350 mIU per mL but her ultrasound was not diagnostic. She states that her pain has resolved and she is no longer having any spotting. Her β -hCG level is currently 2,400 mIU per mL. What is the best next step in management?

- (A) Discharge her home with a diagnosis of pregnancy.
- (B) Obtain an ultrasound to evaluate uterine contents and the adnexa.
- (C) Consult an obstetrician (OB) for a probable missed abortion.
- (D) Discharge her home with a diagnosis of threatened abortion.
- (E) Discharge her with instructions to follow up with OB in 2 days for serial β -hCG levels.

97 In an otherwise normal x-ray, the finding of a "posterior fat pad" on a lateral x-ray of the elbow in adult and pediatric patients is suggestive of which of the following?

- (A) Normal finding in adults, supracondylar fracture in children
- (B) Supracondylar fracture in adults and children
- (C) Radial head fracture in adults, supracondylar fracture in children
- (D) Olecranon fracture in adults, supracondylar fracture in children
- (E) Radioulnar dislocation in adults, supracondylar fracture in children

98 Which of the following statements is true regarding scarlet fever and acute rheumatic fever?

- (A) Both occur concomitantly with group A β -hemolytic streptococcal (GAS) pharyngitis.
- (B) Acute rheumatic fever is a complication of acute GAS pharyngitis that occurs more commonly in adults.

- (C) Scarlet fever occurs acutely with GAS pharyngitis but acute rheumatic fever does not typically occur until 2 to 4 weeks after GAS pharyngitis.
- (D) Scarlet fever is now a rare occurrence due to the *Hemophilus influenzae* type B (HiB) vaccine.
- (E) Both scarlet fever and acute renal failure (ARF) can be prevented by the use of antibiotics for GAS pharyngitis.

99 The use of "triptans" for the treatment of migraine-related headache should be limited to 2 days per week for which of the following reasons?

- (A) Prolonged use may result in pulmonary fibrosis.
- (B) Increased risk of rebound headache.
- (C) Increased risk of cardiac ischemia.
- (D) Development of permanent lower extremity paresthesias and numbness.
- (E) They increase the risk of ischemic stroke.

100 A 3-year-old previously healthy girl is brought to the ED by her parents with a complaint of fever and cough. Her physical examination findings and chest x-ray are consistent with pneumonia. She is tolerating PO without difficulty and appears nontoxic so you plan to discharge her home. Which of the following is the most appropriate antibiotic regimen?

- (A) Doxycycline
- (B) Erythromycin
- (C) Levofloxacin
- (D) Trimethoprim-sulfamethoxazole
- (E) High-dose amoxicillin

Answers and Explanations

- 1** Answer E. The patient is exhibiting a sympathomimetic picture after smoking marijuana, which commonly occurs because of crack cocaine additives. His myocardial ischemia is likely because of a combination of vasospasm and hyperaggregatory platelets. Aspirin is indicated for treatment. His chest pain is resolved and he is not having a segment elevation myocardial infarction (STEMI), so PTCA, tPA, and G2b3a inhibitors are not warranted. Metoprolol is relatively contraindicated in cocaine-induced chest pain as there is a theoretical risk of reducing cardiac output by inhibiting β -receptors in the face of increased peripheral vascular resistance.
- 2** Answer A. The patient has asymptomatic first-degree atrioventricular (AV) block with a prolonged PR interval but no dropped beats. This is commonly seen in healthy individuals, has no prognostic significance, and requires no further evaluation or management.
- 3** Answer C. Propoxyphene has sodium channel blocking properties that can cause QRS prolongation, especially when used in conjunction with other medications that block sodium channels (e.g., tricyclic antidepressants).
- 4** Answer C. This patient most likely has a tubo-ovarian abscess (TOA) complicating pelvic inflammatory disease (PID). Her history suggests that she presented to her primary care doctor with symptoms of PID, but because she only received an antibiotic effective against *N. gonorrhoeae* and has not filled her prescription, she may still have untreated *C. trachomatis* infection. Interestingly, although *N. gonorrhoeae* and *C. trachomatis* are known to be instrumental in the development of a TOA, they are very rarely obtained at culture. Instead, the abscesses tend to be polymicrobial, and include gram-negative enteric organisms as well as anaerobes, such as *E. coli* and *B. fragilis*. It is thought that *N. gonorrhoeae* and *C. trachomatis* initiate the infection, whereas other organisms invade and take over once the initial damage allows them to gain entry and proliferate. All patients with a TOA should be admitted for broad-spectrum antibiotic therapy. Ampicillin, clindamycin, and gentamicin have been the antibiotic combination of choice. Abscesses between 4 and 6 cm in diameter respond to antibiotics alone 85% of the time. Abscesses >10 cm however, often require surgical intervention. If untreated, abscesses continue to expand and may spontaneously rupture, resulting in secondary generalized peritonitis. Roughly 5% to 10% of women with acute PID will develop perihepatitis known as *Fitz-Hugh-Curtis syndrome*. This is primarily because of hematogenous or transperitoneal spread of *C. trachomatis*, and is characterized by right upper quadrant pain and tenderness, pleuritic chest pain, and occasionally elevated liver enzymes.
- 5** Answer B. The patient has a ruptured abdominal aortic aneurysm (AAA), as indicated by the adjacent retroperitoneal hematoma. Ruptured AAAs should be operated on in all patients who do not have absolute contraindications to surgery, as loss of complete blood volume can occur within minutes. There is no evidence that aggressive reduction of blood pressure is helpful in AAA, and it may predispose patients to unnecessary risk of hypotension. Once a ruptured AAA is definitively diagnosed by CT scan, there is little role for further imaging in the ED with angiography or ultrasound. Observation of patients with ruptured AAAs is contraindicated. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:194.)
- 6** Answer C. The patient has binocular diplopia, which resolves when either eye is covered. Causes include all the answer choices, of which choice C (cranial nerve palsy) is the most common. Monocular diplopia occurs in a specific eye and is usually caused by localized eye pathology.
- 7** Answer C. Schizophrenia is a chronic, progressive thought disorder present in 1% of the population. It is characterized by the presence of both positive symptoms (choices A, B, D, and E) and negative symptoms—flat affect, lack of speech, and inability to perform goal-directed activities. Although the positive symptoms are often managed successfully by pharmacotherapy, the negative symptoms are often refractory.
- 8** Answer A. Dilated cardiomyopathy is most commonly idiopathic. Viral myocarditis, chronic alcohol use, Chagas disease, and certain chemotherapeutic agents (doxorubicin, daunorubicin) may also predispose to dilated cardiomyopathy. Tuberculous myocarditis, connective tissue disease, and familial

disease are less common etiologies. Cocaine usually causes hypertrophic cardiomyopathy.

- 9** Answer C. This patient has olecranon bursitis. Olecranon bursitis most commonly occurs because of repetitive microtrauma caused by leaning or rubbing of the elbow. Although most cases of olecranon bursitis are sterile inflammatory reactions, septic bursitis may account for as many as 33% of olecranon bursitis cases. Furthermore, because of the superficial location, septic bursitis is most common in the olecranon and prepatellar bursae, and rarely occurs elsewhere. Predisposing factors to septic bursitis include patients who are immunocompromised because of diabetes, renal insufficiency, and cancer as well as patients with anatomic abnormalities of the joint spaces and surrounding structures such as patients with gouty or rheumatoid arthritis (both of which may involve the bursa). Aspiration of the bursa is the only reliable means available to help differentiate between septic and sterile bursitis. In contrast to the higher number of leukocytes in septic arthritis, septic bursitis is suggested when the WBC count exceeds only 10,000 per mm³. Gram stain is positive in only 50% of cases but *Staphylococcus aureus* is the most common responsible organism. (Figure from Roberts JR. Olecranon bursitis: The technique of bursal aspiration. *Emerg Med News*. 2002;24:20–21, with permission.)

- 10** Answer E. Lithium toxicity generally causes gastrointestinal (nausea, vomiting, abdominal pain), renal (diabetes insipidus), and neurologic (tremor, ataxia, coma) dysfunction. Management involves whole bowel irrigation with polyethylene glycol, intravenous saline rehydration, and dialysis in severe cases. Activated charcoal does not bind lithium. Bicarbonate is used to treat tricyclic antidepressant overdoses. Glucagon is used to treat β -blocker overdoses. Potassium chloride is not useful for management of lithium toxicity except in cases of severe hypokalemia.

- 11** Answer B. β -Blockers are the best initial antihypertensive agents to use in acute cardiac ischemia, due to demonstrated reduction in mortality. Intravenous medications are most appropriate for rapid control of blood pressure—therefore, choices A, C, and E are not indicated. Choice D is an intravenous angiotensin-converting enzyme (ACE) inhibitor, but does not precisely reduce blood pressure and is difficult to titrate.

- 12** Answer D. This patient has a Bartholin's gland abscess, which is an infection of fluid that has accumulated in the gland. Healthy Bartholin's glands

are located at 5 and 7 o'clock around the vaginal introitus and are not palpable. Nonspecific inflammation or trauma may obstruct the glandular duct, however, resulting in accumulation of glandular fluid inside the gland and a Bartholin's gland cyst. Asymptomatic cysts in young women do not require treatment. Older women should have the cyst excised by a specialist in order to search for glandular adenocarcinoma. All patients with an abscess should have incision and drainage followed by the placement of a Word catheter. The catheter is left in place for 6 to 8 weeks to allow formation of a fistulous tract, which enables ongoing drainage and prevents recurrence. Bartholin's gland abscesses are almost always caused by polymicrobial vaginal flora. Antibiotics are unnecessary unless there is an associated cellulitis or unless sexually transmitted organisms are suspected. Cultures of the abscess can be obtained if there is concern about the etiology. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:350.)

- 13** Answer A. Patients with Guillain-Barré syndrome (GBS) always have some element of motor involvement. Purely sensory syndromes do not occur and rule out the diagnosis. Furthermore, motor involvement resulting in weakness is usually predominant over sensory findings such as numbness or paresthesias. Universal areflexia is the rule in patients with GBS, although some patients have only distal areflexia with definite hyporeflexia of the biceps and knee jerks. Patients with GBS commonly suffer autonomic dysfunction, including the development of urinary retention during the evolution of symptoms. Urinary retention is rarely persistent and the anal sphincter muscles are also rarely affected. Although the classic cerebrospinal fluid (CSF) finding is an elevated protein level with a normal WBC count, 50% of patients will not experience an increase in protein level in the first week of illness. By the second week of illness, 80% of patients have an elevated CSF protein level.

- 14** Answer D. Hyphema refers to the presence of blood in the anterior chamber of the eye. The eye may re-bleed after the initial traumatic hyphema, especially in patients with severe myopia or with large hyphemas. General treatment of traumatic hyphema involves analgesia and antiemesis, head elevation, restriction of eye movement, and avoidance of therapies that may cause bleeding. Ophthalmologic consultation should be sought emergently, especially for large hyphemas, as specific management with topical steroids or operative drainage may be instituted. There is usually no afferent pupillary defect.

- 15 Answer E. The EKG demonstrates Wenckebach phenomenon, or Mobitz type I AV block. The PR interval progressively increases in length and predictably drops a QRS beat after the second prolongation. In the absence of symptoms of other serious cardiac disease, management involves outpatient follow-up. Pacemaker placement would be required for patients with Mobitz type II second-degree or third-degree AV block. Atropine is used to treat hemodynamically unstable bradydysrhythmias. Amiodarone may be used to treat a variety of tachydysrhythmias, but is not indicated for patients with AV blocks. Adenosine is used to abort supraventricular tachycardias.
- 16 Answer B. Acute gastroenteritis is most commonly viral, but bacteria account for an important subset of cases. In the absence of severe electrolyte abnormalities, seizures associated with diarrhea are often because of *Shigella* species, which are the most common bacterial causes of acute gastroenteritis overall. *Salmonella* is not typically associated with seizures. *Campylobacter* and *Yersinia* species may cause an illness that mimics appendicitis. *Vibrio* species usually cause a typical, nonspecific gastroenteritis.
- 17 Answer E. Rheumatic fever occurs several weeks after untreated streptococcal pharyngitis. The diagnosis is made by the Jones criteria: Either two major (polyarthritides, erythema marginatum, chorea, carditis, subcutaneous nodules) or one major and two minor (arthralgias, fever, increased erythrocyte sedimentation rate [ESR] or CRP, prolonged PR interval). Migratory arthritides of major joints is the most common symptom, followed by carditis. Chorea and erythema marginatum are uncommon, but fairly specific given a history of antecedent pharyngitis. Despite its name, fever is not common in patients with rheumatic fever.
- 18 Answer C. The thoracic outlet syndrome comprises a group of pathologic conditions associated with compression of the structures at the junction of the upper extremity and trunk. The findings are neurologic (95%), venous (4%), and arterial (1%). The most commonly affected structure is the ulnar nerve.
- 19 Answer B. Nonintentional blunt thoracic injury in children rarely causes multiple rib fractures, due to the compliance of the pediatric chest wall. For this reason, external injury is often absent, although pulmonary and cardiac injuries may be prominent. Multiple rib fractures are usually caused by child abuse, especially rib fractures which are observed radiographically to be in various stages of healing. Falls and sports injuries rarely cause rib fractures in children. Gunshot wounds are much more likely to cause thoracic organ damage than serious chest wall injuries.
- 20 Answer C. Therapies such as angioplasty with stenting have significantly reduced the mortality of acute MI, causing a reduction in the overall mortality due to heart disease. Ischemic heart disease is the most common cause of death in this country among all patients, including all women. Most MIs occur in patients older than 65. Most deaths due to MI occur outside the hospital setting.
- 21 Answer B. This patient has necrotizing fasciitis caused by *Clostridium* spp., which gained entry when his arm was punctured while hiking. *Clostridium perfringens* is the most common species and is prevalent in soil. Pain is the most common early finding and is generally intense and unremitting. Swelling, pallor, and tenderness rapidly develop. Hemorrhagic bullae and brownish, serosanguineous discharge may develop as the wound progresses. Crepitus may also be present, but it is neither a sensitive nor specific finding. Treatment is prompt, aggressive surgical debridement and intravenous antibiotics. Despite this, amputation is frequently necessary. Use of advanced imaging to delineate spread along fascial planes delays definitive therapy and may result in a worse outcome.
- 22 Answer D. Trauma in the setting of submersion injuries is usually because of motor vehicle accidents (in which the vehicle crashes into water), or accidents involving diving, boating, or falls from a height into water. Although antibiotics are of use in patients who were submerged in grossly contaminated fluid (e.g., sewage), they have no role in routine fresh or saltwater submersion. Corticosteroids also have no role in drowning patients unless patients have a history of reactive airway disease and have evidence of bronchospasm on physical examination. Because this patient was involved in a high-speed crash, trauma-related injury should be the next most important issue after ensuring an adequate airway, breathing and circulation.
- 23 Answer B. Only acetazolamide and dexamethasone have been shown to be effective for the prevention of acute mountain sickness (AMS). Acetazolamide is a carbonic anhydrase inhibitor, which prevents the reabsorption of bicarbonate in the proximal tubule. The resulting bicarbonate diuresis causes a metabolic acidosis within 1 hour of ingestion, which stimulates ventilation and speeds ventilatory acclimatization. In addition, acetazolamide reduces periodic breathing during sleep, thereby eliminating

the associated apnea and hypoxia. Dexamethasone has also been shown to reduce the symptoms of AMS, although its mechanism of action is not known. Furthermore, patients can experience a rebound phenomenon upon stopping the drug so it is generally reserved for the treatment of AMS rather than prophylaxis. Nifedipine is useful for prophylaxis of high altitude pulmonary edema (HAPE) but it has no role in AMS. Caffeine stimulates the hypoxic ventilatory response but has not specifically been shown to reduce the incidence of AMS.

24 Answer C. Sympathomimetic and anticholinergic crises may be very difficult to distinguish on clinical grounds. Both toxidromes exhibit tachycardia, delirium, mydriasis, and hyperthermia. The presence of diaphoresis indicates that a sympathomimetic cause is far more likely, as patients with anticholinergic crises have inhibition of their sweat glands. However, the absence of diaphoresis is not necessarily diagnostic of an anticholinergic syndrome, as patients with sympathomimetic crises may have profound dehydration. Seizures may occur in either toxidrome, although it is probably more common in sympathomimetic states.

25 Answer E. The patient has clear evidence of meningitis. The acute onset, progressive nature, and severe symptoms all indicate a likely bacterial cause. With evidence of alteration in mental status, CT scan before lumbar puncture may be advisable. However, in cases where bacterial meningitis is clinically suspected, antibiotics should be administered before the patient is sent to CT scan or lumbar puncture is performed. Additionally, adult patients with suspected bacterial meningitis should receive dexamethasone with or before the first dose of antibiotics.

26 Answer B. Acetaminophen is metabolized by a variety of pathways, the most important of which is through the cytochrome P-450 system, which produces *N*-acetyl-*p*-benzoquinone imine (NAPQI) which is the toxic metabolite causing hepatocyte necrosis. The drug *N*-acetylcysteine (NAC) reduces the amount of acetaminophen metabolized by this route by replenishing glutathione, the reducing agent which induces sulfation of acetaminophen to a non-toxic compound. A single, acute dose of 7.5 g of acetaminophen may be enough to overwhelm endogenous glutathione activity in an adult patient. The lowest acute ingestion of acetaminophen requiring treatment with NAC in a child is 150 mg per kg.

27 Answer B. Pelvic inflammatory disease (PID) is an infection of the fallopian tubes. Risk factors include young age (15 to 25 years is the highest risk group),

multiple sexual partners, smoking, and bacterial vaginosis. It is caused by *Chlamydia*, gonococcus, and organisms, which cause bacterial vaginosis. The peak time of onset is within 1 week of menses, as menstrual flow is thought to provide an optimal culture medium for bacterial ascension. Symptoms include diffuse pelvic pain, fever, nausea, vomiting, vaginal discharge, and dyspareunia. Patients usually exhibit bilateral adnexal tenderness with significant cervical motion tenderness and cervical discharge. Laboratory studies are more useful to rule out other causes of symptoms as PID is a clinical diagnosis. Treatment involves antibiotics to cover *Chlamydia* and gonococcus—the most common regimen is IM ceftriaxone plus doxycycline/azithromycin. Sequelae of untreated PID are extremely serious, including tubal scarring causing infertility and ectopic pregnancy, chronic pelvic pain, and tubo-ovarian abscess (TOA).

28 Answer D. Sternoclavicular dislocations may occur in the anterior or posterior direction. Anterior dislocations are more common and occur because of a medially directed force to the shoulder. These injuries are unlikely to cause serious injury beyond the dislocation itself. Posterior dislocations result from a posteriorly directed force to the sternoclavicular joint and may cause great vessel, mediastinal, or airway injury. CT is more accurate than either plain films or ultrasound for the diagnosis of both anterior and posterior sternoclavicular dislocations.

29 Answer B. Hypoxemia is the most immediate life threat to patients with COPD exacerbations. This patient's pulse oximetry of 85% indicates severe hypoxemia. Although an arterial blood gas (ABG) could be performed to verify this patient's hypoxemia and to elucidate the degree of CO₂ retention, it is clear that what this patient needs is oxygen. A reasonable goal of oxygen therapy should be to titrate it to a saturation of 90%. Early observational studies demonstrated that some degree of worsening hypercapnia usually occurs following increased oxygen delivery to patients with COPD. This should not be confused with a decrease in the patient's respiratory drive. Instead, increasing hypercapnia results primarily from worsened ventilation/perfusion (\dot{V}/\dot{Q}) mismatching and because of the Haldane effect in which oxygenated erythrocytes have a decreased affinity for CO₂, causing CO₂ offloading and an increase in blood CO₂ concentrations. Although this patient may eventually require intubation, it is prudent to try noninvasive measures, including noninvasive ventilation before endotracheal intubation.

30 Answer C. Lyme disease is a multisystem illness caused by the spirochete, *B. burgdorferi*, which is

acquired by tick bites. The major endemic areas are the northeastern and midwestern United States. The initial manifestation is the characteristic rash called *erythema migrans*, which starts near the tick bite and spreads outward with central clearing. A few weeks after the onset of *erythema migrans*, patients can develop nonspecific symptoms such as malaise, fatigue, and headaches. Cranial nerve palsies, meningitis, and carditis may follow. Several months to years later, patients can exhibit chronic arthritis, persistent neurologic deficits, and chronic fatigue. Seventh nerve palsy, which may be bilateral, is the most common neurologic physical examination finding in Lyme disease. Lyme meningitis is similar to aseptic meningitis, lacking the clinical or laboratory findings of bacterial meningitis. First-line therapy is with doxycycline (or amoxicillin for pregnant/nursing women and children younger than 8 years).

Answer A. Flumazenil is a benzodiazepine antagonist that is used only in selected cases to reverse benzodiazepine overdose. The only real indications for flumazenil are to speed recovery in accidental pediatric ingestions and during procedural sedation. Flumazenil can precipitate seizures in patients who are chronic benzodiazepine users, alcoholics, and those who have co-ingested medicines which lower the seizure threshold. The morbidity and mortality of benzodiazepine overdose is mostly from respiratory depression. Therefore, standard airway management, oxygenation, and ventilation preclude the use of flumazenil in almost all cases.

Answer C. This patient has acute mountain sickness (AMS), which is characterized by the presence of a headache (which is typically bitemporal or occipital) and at least one other symptom including gastrointestinal upset (nausea, anorexia, or vomiting), fatigue, dizziness, lightheadedness, or difficulty sleeping. The key principle in the management of AMS is that further ascent is absolutely contraindicated. This is especially important because the severity of the symptoms at onset cannot predict the clinical course. If the symptoms are mild and shelter is available, remaining at the current altitude or treatment with acetazolamide or dexamethasone are options. However, descent is the most effective means of treatment.

Answer C. Although this patient may have an early normal pregnancy and a threatened abortion; she is at risk for an ectopic pregnancy. Because the patient's serum β -hCG level is below the discriminatory threshold (the level at which a normal pregnancy can be detected by ultrasonography), the main reason

for obtaining an ultrasonograph is to search for an ectopic pregnancy. Approximately 50% of women with an ectopic pregnancy have a β -hCG level $<3,000$ mIU per mL and symptomatic patients with a β -hCG level $<1,000$ mIU per mL are four times more likely to have an ectopic pregnancy than those patients with higher β -hCG levels. If the ultrasonograph is nondiagnostic and the patient is otherwise stable, she can be discharged with instructions to follow-up with her OB in 2 days for a serial β -hCG level. In that case, her diagnosis remains unclear, so she could be given a diagnosis of "possible ectopic pregnancy versus threatened abortion." Once her β -hCG level has risen beyond the discriminatory zone, her ultrasonogram should be repeated to evaluate for the presence of a normal pregnancy.

Answer B. The spleen and the liver (in that order) are the most commonly injured abdominal organs in children with blunt trauma. Liver lacerations tend to have higher mortality than splenic lacerations. Unlike the past, splenic lacerations are currently nonoperatively managed as much as possible, because of the deleterious immunologic effects of splenectomy. Renal injury is also common, given its proportionally larger size in children relative to adults. Bowel injury in blunt trauma is rare.

Answer C. Locking or clicking of the knee is often due to a meniscal injury, usually medial. Patients may not recall a specific traumatic event and chronic, repeated trauma may predispose to the injury. The medial meniscus is less mobile and therefore more predisposed to injury than the lateral. Knee locking from medial meniscal tears may be relieved by applying valgus stress and gentle extension.

Answer B. Metacarpal neck fractures are common fractures that are managed differently depending on the digit involved. Although most metacarpal neck fractures have volar angulation, the hand can tolerate angulation to a certain extent due to mobility at the carpometacarpal (CMC) joint. Up to 45 degrees of volar angulation is acceptable in the ring and little finger metacarpals due to their increased CMC joint mobility. In contrast, the relatively fixed index and long finger metacarpals permit only 15 degrees of angulation. Therefore, metacarpal neck fractures of the index and long finger require more accurate alignment. Rotational deformities are poorly tolerated in all digits and almost always require operative fixation. Reduction of metacarpal neck fractures is most easily accomplished in the "90-90" method with the MCP joint and proximal interphalangeal (PIP) joint flexed to 90 degrees. Pressure in a volar direction is then applied to the

metacarpal shaft while simultaneous pressure in a dorsal direction is applied to the flexed PIP joint. Once reduced, metacarpal neck fractures should be placed in a gutter splint.

37 Answer C. Exercise-induced asthma (EIA) is common, although estimates for the prevalence of this entity vary widely, from 50% to 90% of patients with asthma, as well as 40% of patients with allergic rhinitis, and 11% of the general population. Although patients with EIA frequently have symptoms during exercise, the peak of their symptoms generally occurs 5 to 10 minutes *after* exertion, and typically dissipates after 30 minutes. If treatment is required, it is typically required only to abort the acute symptoms after which the patient remains symptom-free. Because both heat and water loss apparently induce bronchospasm, cold, dry air is more likely to cause EIA. Therefore, outdoor winter athletes (e.g., cross-country skiers, runners) are more likely to be affected than summer athletes (e.g., swimmers). Interestingly, through a poorly understood mechanism, patients who have had an episode of EIA frequently experience a 1-hour partial refractory period to further exacerbations. Finally, although EIA can be exercise limiting, most patients can exercise fully without any ill effects. In fact, the prevalence of EIA in US Olympians competing in the 1996 and 1998 Summer and Winter Olympics has been reported as 16.7% and 22.4% respectively. Prophylactic treatment with β_2 -agonists may help prevent symptoms from occurring during exercise.

38 Answer A. The standard serum digoxin assay measures levels of all digoxin in the body, including drug bound to Fab fragments. It is not useful to measure digoxin levels once Fab has been given. Precedence should be given to dialysis to remove the drug-Fab complexes. Cardioversion may be performed in unstable patients, but is unlikely to be curative in patients with digitalis toxicity. Procainamide should be avoided in patients with digitalis toxicity as it may exacerbate dysrhythmias. Calcium chloride should be avoided in patients with digitalis toxicity to prevent theoretical risk of "stone heart," which occurs from massive calcium influx into cardiac myocytes causing sustained contraction. Potassium chloride should be given with extreme caution in patients with digitalis toxicity, as hyperkalemia is life threatening in this setting.

39 Answer A. Patients may be treated with labetalol or nitroprusside in order to reach this blood pressure goal if they are initially more hypertensive. Answer D represents the blood pressure limits that should necessitate antihypertensive in any patient with

ischemic stroke. Patients with blood pressure below this threshold do not require treatment.

40 Answer C. In the past, patients with signs of intracranial hypertension after head trauma were hyperventilated to $PCO_2 < 25$ mmHg in order to cause reflex cerebral vasoconstriction and reduced cerebral blood volume. However, more recent research suggests that reducing the PCO_2 levels to below 30 mmHg may cause cerebral hypoxia in many areas of the brain, potentially worsening chances for neurologic recovery. The appropriate PCO_2 range for hyperventilation appears to be between 30 and 35 mmHg—this will result in modest cerebral vasoconstriction without hypoxia. An arterial catheter is useful for measuring rapid, serial blood gases to maintain the PCO_2 in this range.

41 Answer B. As in patients with rheumatoid arthritis, arthralgias and arthritis affect primarily the hands and wrists and are symmetrical. Joint involvement tends to be less severe in patients with systemic lupus erythematosus (SLE), however, and joint deformities are less common. The classic malar rash is only present in 40% of patients at onset, but 50% of patients at any time throughout the disease course. Seizures are the most common neurologic manifestation, and may be present in up to 70% of patients. Stroke may occur, particularly in patients with SLE and antiphospholipid syndrome. Pericarditis is the most common cardiac manifestation, present in 30% of patients. Libman-Sachs endocarditis (sterile vegetations) is present in 10% of patients. Drug-induced lupus normally resolves within days to weeks of stopping the offending agent. Hydralazine and procainamide are the most common offenders, although isoniazid can also result in drug-induced lupus.

42 Answer C. Benzodiazepines are recommended for sedation of patients in anticholinergic crises due to their antiepileptic activity and absence of anticholinergic activity. Neuroleptic agents may exacerbate seizures and anticholinergic symptoms. Etomidate is too short acting for sedation due to agitation and may cause rapid respiratory insufficiency. Ketamine increases blood pressure and will exacerbate delirium, especially with its potential for the emergence phenomenon.

43 Answer D. CRPS (formerly known as reflex sympathetic dystrophy) refers to a chronic pain condition that occurs in an extremity following trauma or surgery. Formerly a vaguely characterized process, criteria have been established to make the diagnosis—*allodynia* (pain due to nonpainful

stimuli), burning quality, bone scan and radiographic abnormalities, and changes in sweating/temperature/hair/color. When an actual peripheral nerve is demonstrated to be damaged, the condition is known as *CRPS-II*. Treatment is controversial and has traditionally been handled like most chronic pain conditions.

147 Answer B. Phencyclidine, or PCP, causes extreme dissociation, agitation, psychosis, and violent behavior. Superhuman strength often occurs in patients with PCP intoxication, sometimes requiring a dozen people to adequately restrain them. Vertical or rotary nystagmus is a physical examination finding characteristic of PCP intoxication. Cocaine intoxication may cause agitation, psychosis, and mydriasis, but not nystagmus. Lysergic acid diethylamine (LSD) is a typical hallucinogen, and methylenedioxymethamphetamine (MDMA) or ecstasy is similar to a combination of a hallucinogen and amphetamine. Heroin causes a typical opioid toxidrome, with constricted pupils, sedation, and respiratory depression.

148 Answer B. Right ventricular infarction can be better assessed with a right-sided EKG, which is the mirror image of a standard 12-lead EKG. The right-sided V_4 lead (rV_4) is placed at the right fifth intercostal space, mid-clavicular line. Elevation of the ST segment in this lead is the most specific for right ventricular infarction. Nitrates should be avoided in patients with right ventricular infarction, as these patients are very dependent upon passive filling of the right heart by the great veins (preload) due to the decreased active contraction of the right ventricle. Reducing the preload with nitroglycerin will reduce the passive filling and cause hypotension.

149 Answer B. Botulism is a neurologic syndrome caused by *Clostridium botulinum*, an anaerobic, gram-positive bacillus that produces botulinum toxin. Botulinum toxin is the strongest known biologic toxin, but is heat-labile, and can be inactivated by adequate preparation. Infant botulism, usually spread by honey, is the most common form of botulism, followed by food-borne botulism. Botulinum toxin blocks presynaptic acetylcholine release, causing cranial nerve palsies, parasympathetic inhibition, and descending paralysis. The diagnosis is generally made clinically, with specific toxin assays to aid in confirmation. Management involves aggressive airway evaluation and protection (due to pharyngeal muscle weakness), monitoring of vital capacity and respiratory strength, and equine antitoxin. There is little data regarding the efficacy of antibiotic therapy, and currently antibiotics are not indicated.

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148 Answer A. Management of hydrocarbon toxicity is generally supportive. Hydrocarbons most commonly cause pulmonary toxicity and cardiac dysrhythmias. The most common scenarios are inhalation through "huffing" paint or glue cans and oral ingestion of hydrocarbons, followed by nausea, vomiting, and pulmonary aspiration. There is no evidence that antibiotics, steroids, or diuretics improve outcomes in hydrocarbon aspiration. Activated charcoal does not bind hydrocarbons and should not be used.

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- 51** Answer B. The classic neurologic deficit seen in central cord syndrome is upper extremity weakness greater than lower extremity weakness. This is

because of the cervical motor axons being closer to the midline than the lumbar motor axons. Large central cord injuries can initially be clinically indistinguishable from complete cord syndromes. Anterior cord syndrome results in deficits of bilateral motor function and pain/temperature sensation with sparing of vibration/position sensation. Brown-Sequard syndrome, or cord hemisection, results in deficits in ipsilateral motor function and vibration/position sensation and contralateral pain/temperature sensation. Cauda equina syndrome, usually due to disk herniation, preferentially affects the lower extremities and bowel/bladder function. Complete cord injury affects all neurologic functions below the level of injury.

53 Answer C. Epinephrine dosing remains a confusing topic, largely because guidelines vary in their nomenclature. To make things simple, it is easy to remember that 1:1,000 doses are always given subcutaneously, whereas 1:10,000 doses are given intravenously. The concentration of a 1:1,000 solution of epinephrine is 1 mg per mL, whereas the concentration of a 1:10,000 solution is 0.1 mg per mL (i.e., ten times less concentrated). Therefore, 0.3 mL of a 1:1,000 solution is 0.3 mg. Delivery of 0.2 to 0.5 mg of epinephrine subcutaneously is an adequate dose in the setting of refractory asthma. This dose may be repeated every 20 to 30 minutes up to three doses as with terbutaline.

53 Answer D. Achalasia is an esophageal motility disorder due to failure of the lower esophageal sphincter to relax and a complete absence of esophageal peristalsis. It affects men and women equally and presents between the third and fifth decade. Dysphagia is the most common symptom. All patients have difficulty with solid foods but two thirds of patients describe dysphagia with liquids as well. Patients may stand after eating, raise their arms above their head or straighten their back to increase esophageal pressure and help esophageal emptying. Patients with achalasia have symptoms for an average of 2 years before diagnosis and they are often treated for GERD due to the presence of burning chest pain. Diffuse esophageal spasm and nutcracker esophagus are hypermotility disorders resulting in exceedingly strong esophageal peristaltic contractions. The most common complaint is chest pain, although the presence of dysphagia is less common and more variable. Schatzki's ring is a fibrous band-like stricture in the distal esophagus that is present in up to 15% of the normal population. Patients who develop symptoms typically present with acute esophageal obstruction.

54 Answer C. The most common cause of bacterial meningitis in middle-aged and older adults is pneumococcus. Group B streptococcus is common among neonates, *Listeria* in extremes of age, and meningococcus in young adults. *H. influenzae* used to be a very common cause of bacterial meningitis among children, but the introduction of the Hib vaccine has drastically reduced the frequency of this pathogen.

54 Answer D. Children have the lowest mortality from status epilepticus, whereas elderly adults have the highest mortality. In the most widely cited study of status epilepticus to date (the "Richmond" study), overall mortality was 3% in children younger than 16 years, and 38% in elderly adults older than 60. Although lorazepam is favored by many physicians, there is no clear evidenced-based drug of choice. In the veterans affairs (VA) cooperative study, there was no statistically significant difference when lorazepam was compared with phenobarbital, diazepam plus phenytoin, or phenytoin alone as frontline agents. There was only a statistically insignificant trend in favor of lorazepam. The most common side effect of benzodiazepines given for status epilepticus is hypotension. Hypoventilation is the second most common side effect. Subtherapeutic drug levels are the most common trigger of status epilepticus and status epilepticus due to subtherapeutic drug levels has a low mortality. The next most common cause of status epilepticus among adults is cerebrovascular accidents (CVA).

56 Answer B. Syncope with aortic dissection mandates evaluation of the pericardial space to check for hemopericardium and tamponade. Dissections extending back to the pericardium are ascending and should be taken emergently to surgery. The most common symptom of aortic dissection is chest pain, although dyspnea is often seen as well. Aortic regurgitation is not usually seen in aortic dissection, but indicates a valvular disruption when present. Dissection into the coronary arteries occurs rarely, but when it does, the right coronary artery is most frequently affected. Interarm differences in blood pressure due to unilateral extension of the dissection into the subclavian artery occur in the minority of patients with aortic dissection. However, in patients with undifferentiated chest pain, interarm differences of >20 mm Hg indicate a higher likelihood of aortic dissection.

57 Answer B. In normal adults, the postvoid residual volume should normally be <50 mL. Values above 200 mL are considered definitely abnormal. Values

between 50 and 200 mL require clinical correlation. The normal postvoid residual volume increases with age, but does not rise to >50 to 100 mL. The postvoid residual volume should be checked in all patients with back pain and any urinary complaints. Although the most common finding in patients with epidural spinal cord compression is motor weakness in the lower extremities, occasionally patients may present with isolated urinary complaints. Typically, however, urinary retention or incontinence is a late finding of spinal cord compression.

- 58** Answer D. Dihydroergotamine (DHE) is a norepinephrine reuptake inhibitor at sympathetic nerve endings, which results in potent vasoconstriction, and it is an agonist at multiple serotonin receptors (5-HT_{1A-F}). The half-life of DHE and its metabolites is roughly 72 hours compared with the shorter duration of the triptans, which have a half-life of 3 to 6 hours. Therefore, DHE is particularly useful for the treatment of patients with chronic daily migraine as well as status migraine, which is defined as any migraine headache lasting longer than 72 hours. The major side effect associated with DHE is nausea, so pretreatment with an antiemetic such as prochlorperazine or metoclopramide 30 minutes before administration is recommended when given in the hospital.
- 59** Answer A. Mucormycosis (also known as *zygomycosis*) is a rapidly invasive opportunistic infection that may affect numerous organ systems in the host. However, the most common entity it causes is rhinocerebral mucormycosis (RCM). It is acquired by inhalation of the spores (ubiquitous in soil, decaying fruit and vegetables, old bread) followed by rapid invasion of the vasculature. Because of its propensity for invading vascular structures (i.e., angioinvasive), infarction of tissues dependent on the affected blood supply frequently ensues. The resulting necrotic mucosa appears black to the examiner, and it may be friable and insensate as well, but no bleeding is present because of vascular infarction. Although a black eschar is the classic finding of RCM, it is present in less than half the number of patients. Furthermore, its presence portends a rapidly progressive course with a poor prognosis. Urgent surgical debridement and intravenous antifungal therapy are required to prevent intracranial extension and further tissue destruction. With such early intervention, mortality rates are now <20%. RCM most commonly occurs in diabetic patients with very poor glycemic control. However, transplant recipients, as well as patients undergoing deferoxamine treatment, or patients with renal failure, extensive burns or trauma, may all

be predisposed to develop mucormycosis. Interestingly, affected patients without diabetes but with another predisposing risk factor have much higher mortality rates from 60% to 80%.

- 60** Answer A. Acetaminophen is metabolized by choices A through D. The major route is glucuronidation catalyzed by UDP-glucuronyl transferase in the liver. Sulfation is the next most common route and is the target mechanism for N-acetylcysteine (NAC) therapy. Oxidation by cytochrome P-450 results in the formation of NAPQI, which is responsible for the hepatic necrosis caused by acetaminophen overdose. Direct renal excretion represents approximately 5% of the metabolism of acetaminophen. Plasma metabolism of acetaminophen does not generally occur.
- 61** Answer E. As with many problems, the incidence of the varying underlying causes of hemoptysis in children is dependent on the specific population which is studied. In tertiary care hospitals which serve as major referral centers for congenital heart disease, this will be a much more frequent cause of hemoptysis encountered by physicians. Still, cystic fibrosis is, by far, the most common cause of hemoptysis in the pediatric population, responsible for approximately 65% of cases in tertiary centers. Other common causes include upper airway bleeding from infected tonsils or adenoids, which was thought to represent hemoptysis, as well as foreign body aspiration. Infectious causes such as TB are much less common in the United States, although it may be prevalent in the developing world. Congenital cardiac disease is an uncommon cause, as is trauma, whereas tumors and pulmonary-renal syndrome are quite rare.
- 62** Answer C. Abdominal pain and diarrhea occur in practically all cases of Shigellosis, and is often accompanied by fever. However, only 35% to 40% of patients have evidence of blood in their stools. Resistance to trimethoprim-sulfamethoxazole is widespread, making fluoroquinolones the drug of choice. Antimotility drugs may be safely given if antibiotics are also administered but are contraindicated when used alone as they may actually worsen the clinical course. Most infections are caused by *Shigella sonnei*, with only a minority of infections caused by *Shigella dysenteriae*. Although *Salmonella* spp. requires a very large inoculum to cause disease, infection with *Shigella* spp. requires a very small inoculum, making *Shigella* the most efficient enteric human pathogen known. Fecal leukocytes are almost universally detected in patients with Shigellosis, as *Shigella* invades the mucosa resulting in local

destruction and inflammation. Seizures may occur in children infected with *Shigella*.

63 Answer A. The patient is a young adult with clinical evidence of community-acquired pneumonia. In a young patient without serious comorbidity or severe distress, outpatient therapy is appropriate. Major pathogens in this age-group include pneumococcus, *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, and others. Appropriate therapy could include a macrolide, a second- or third-generation cephalosporin, a fluoroquinolone, or doxycycline. Doxycycline is inexpensive, covers most organisms implicated in community-acquired pneumonia, and has convenient twice-a-day dosing. Linezolid is used to treat vancomycin-resistant organisms, most often seen in the nosocomial setting. Cephalexin is a first-generation cephalosporin with poor coverage of atypical organisms and gram negatives. Clindamycin provides excellent coverage of gram positives and anaerobes, but does not cover atypicals or gram negatives. Piperacillin-tazobactam is a potent, broad-spectrum, anti-pseudomonal antibiotic used only for nosocomial pathogens causing severe illness.

64 Answer E. Koplik's spots are irregularly shaped bright red macules that contain a central, punctate, bluish-white spot. Their presence is pathognomonic for measles. They are most commonly found on the buccal mucosa and are classically located opposite the second molars.

65 Answer B. This patient has aspiration pneumonitis, which is a chemical pneumonitis caused by the aspiration of acidic gastric contents. The severity of lung injury increases as the pH drops, and most studies agree that the pH must be <2.5 to cause significant injury. Chemical aspiration most commonly occurs in patients who have depressed levels of consciousness, as in this patient, and usually occurs in young persons. Aspiration is otherwise a common problem among elderly persons in nursing homes after strokes. Though they are widely used, antibiotics and corticosteroids are not routinely recommended in patients with aspiration pneumonitis. Gastric acid inhibits bacterial growth so gastric contents are sterile under normal conditions. Unless the patient has a coexisting condition promoting gastric bacterial growth, antibiotics should not be used. Such conditions include patients on antacid therapy, patients receiving enteral feeding, and patients with known gastroparesis or small bowel obstruction. Corticosteroids are also widely used in patients with chemical aspiration, although they have not been proved to be beneficial. (Figure reprinted with permission from

Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:547.)

66 Answer B. Inadequate sedation of recently intubated patients is a common problem in the ED. Although the common initial response to the waking patient is to infuse paralytics, such action is typically not necessary. Usually, all that is required is adequate sedation with benzodiazepines with or without narcotic agents such as morphine or fentanyl. Paralytics should be considered in the patient with persistently high plateau pressures despite optimal ventilatory management and sedation. In such patients, paralysis ensures that the patient's intrinsic respiratory effort will not interfere with the ventilator's attempts at delivering breaths. However, because paralysis increases the risk of aspiration and subsequent pneumonia, paralytics should not be routinely used. Hyperkalemia is not likely to cause the patient's agitated mental status.

67 Answer A. The most likely diagnosis is tumor lysis syndrome, a constellation of events that results from rapid cellular death due to chemotherapy. Rapidly growing and hematologic malignancies highly responsive to chemotherapy are at highest risk for development of tumor lysis syndrome. Hyperkalemia, hyperuricemia, and hyperphosphatemia are the most common laboratory abnormalities. Hypocalcemia is more common than hypercalcemia. Severe fluctuations in magnesium levels are rare. Renal insufficiency and dysrhythmias are the most serious complications. Management involves normalization of electrolyte abnormalities (especially hyperkalemia), intravenous fluids, and treatment of renal insufficiency. Alkalinization therapy to counteract hyperuricemia is not universally recommended, as it may exacerbate electrolyte abnormalities. Renal failure requiring dialysis is a poor prognostic indicator.

68 Answer E. Because *Pneumocystis carinii* cannot be cultured, and the gold standard in making the diagnosis remains invasive (bronchoscopy and subsequent staining), there has been much interest in trying to find surrogate serum markers to indicate the presence of *Pneumocystis carinii*. Most of this interest has focused on LDH. Unfortunately, although it is true that LDH levels are elevated in the setting of PCP, this finding is not specific for PCP. A recent study found that the average LDH level was $1,217 \pm 88$ U/L in patients with PCP compared with 776 ± 55 U/L in patients with non-PCP ($p < 0.001$). However, in this study, the LDH level was not clinically useful in differentiating between PCP and non-PCP at any particular level. Instead, the investigators found

that the level of LDH correlated with the degree of radiographic severity. This supports the idea that elevated LDH levels are more a reflection of lung inflammation than for any particular organism. Lactate levels and liver transaminases have no role in the diagnosis of PCP. Most patients with PCP and hypoxia have a respiratory alkalosis, as their respiratory rate (and depth) increases with the severity of their hypoxia. Finally, patients with CD4 counts <200 are most susceptible to PCP and it is this population who should be on chemical prophylaxis. Pleural effusions are not common in PCP.

69 Answer C. A positive Nikolsky's sign occurs when pressure applied to the margin of a blistered or ulcerated lesion expands the lesion into the adjacent apparently normal skin. This is also known as *marginal modification*. In addition, direct pressure applied to normal-appearing skin that is distant from any blistered lesions may also result in an erosion or ulceration. This is known as *direct modification*. These findings occur because of intraepidermal acantholysis (separation of keratinocytes from their neighbors within the epidermis). Nikolsky's sign is most commonly associated with pemphigus vulgaris, but may also be found in staphylococcus scalded skin syndrome (SSSS) and toxic epidermal necrolysis (TEN). There are also multiple reports of other disease associations but the finding (particularly of direct modification) is very specific for pemphigus vulgaris.

70 Answer B. This patient is infected with the common pinworm, or *Enterobius vermicularis*. It is probably the most common parasitic infection in the United States. The most common clinical manifestation is pruritus ani. However, most infections are asymptomatic. Adult worms are white colored, are approximately 1 cm in length and live in the cecum. At night, pregnant female worms containing an average of 10,000 ova migrate to the perianal skin, deposit their eggs, and die. The resulting pruritic sensation induces the patient to scratch and enables further autoinoculation or spread to other persons unless the patient engages in proper hand washing before touching others. The most sensitive test is the "scotch tape" test in which tape attached to a tongue blade is pressed against the perianal skin in an attempt to affix some of the *Enterobius* ova to the tape. The contents of the tape are then spread on a slide and viewed under a microscope in toluene. Stool samples for ova and parasites are not effective because the organism is not shed in the stool. Metronidazole is not effective for treatment. Instead, treatment is with albendazole, mebendazole, or pyrantel pamoate. Eosinophilia generally does not occur. On occasion,

Enterobius may cause urinary tract infections and vulvovaginitis through retrograde migration into the urethra or vagina. Interestingly, girls with urinary tract infections are twice as likely to have a concomitant pinworm infection.

71 Answer E. Patients with Reiter's syndrome frequently have conjunctivitis early in the disease course. Uveitis (or iritis) may also occur but is less common and unrelated. Roughly 10% of patients will develop keratoderma blennorrhagica, waxy plaques most commonly present on the palms and soles. Sausage-shaped inflammation of the digits (dactylitis) is another common occurrence in Reiter's syndrome. Finally, painless ulcers may develop in the mouth or on the penis (where they are called *Balanitis circinata*), where they more frequently occur in uncircumcised men.

72 Answer A. This is known as *splitting the fourth* digit and it represents the dividing line between median and ulnar innervation to the ring finger. The median nerve also serves the "LOAF" muscles, which include the lumbricals, as well as the muscles, which allow thumb opposition, abduction and flexion. However, the hallmark of CTS is sensory involvement, with motor abnormalities developing later. The most sensitive finding for CTS is abnormal sensation of the distal palmar tip of the index finger, as this represents the autonomous zone of the median nerve (the area where there is no overlap with other cutaneous nerves). Tinel's sign is the presence of distal paresthesias in the setting of median nerve percussion at the wrist. In the absence of sensory or motor symptoms, Tinel's sign has inadequate sensitivity and specificity to guide referral for further specialized testing.

73 Answer C. The patient most likely has myocarditis, which in the United States is usually because of viruses, most commonly Coxsackie B. A viral prodrome usually precedes overt signs of cardiac involvement, such as chest pain or signs of heart failure. No common ED laboratory or imaging study is helpful in making the diagnosis of myocarditis—antimyosin scintigraphy or more invasive endomyocardial biopsy is indicated. Coronary artery disease is uncommon in patients of this age in the absence of risk factors. Aortic dissection is uncommon in the absence of trauma or history of hypertension or Marfan's disease. Stroke is not suggested by the symptoms, and diabetic ketoacidosis (DKA) is unlikely with normal glucose and bicarbonate.

74 Answer E. Intimate partner abuse (IPA) encompasses the following old terms—domestic violence,

domestic abuse, and spousal abuse. It is likely to be vastly underreported by both men and women. ED patients are at high risk for being victims of IPA, but that large majority of patients will not report IPA unless specifically asked to by a care provider in the absence of their intimate partners. Screening of all patients is the only way to accurately evaluate IPA among ED patients. Most violence against women is perpetrated by intimate partners, but most violence against men is perpetrated by strangers. Almost one fourth of women and 10% of men of all sexual orientations report an incident of IPA. Victim substance abuse is a marker for IPA, but is not thought to contribute to IPA—perpetrator substance is known to contribute to IPA.

- 75** Answer B. Elderly white men have the highest rate of completed suicide, representing more than three fourths of all suicide deaths, and women have the highest rate of suicide attempts. White patients are more likely to commit suicide than blacks or Hispanics, and nonpregnant women of child-bearing age are more likely than pregnant women to do so. Divorced patients have higher rates than unmarried patients, who, in turn, have higher rates than married patients. Most successful suicide attempts involve firearms and most unsuccessful attempts involve drug ingestions. The presence of a firearm in the house is an independent risk factor for completed suicide and the patient should be directly asked about this on history. Substance abuse, especially alcohol and cocaine, is extremely common in patients who complete suicide. Patients who present to the ED with attempted suicide must be evaluated for medical illness that may masquerade as mood disorder or thought disorder leading to the suicide attempt. Roughly 20% of patients with major depression and 10% of patients with schizophrenia commit suicide.

- 76** Answer C. Fat, tendons, and bones have the greatest resistance to electrical flow (bones have the highest resistance of all) whereas nerves, blood, mucous membranes, and muscle have the least resistance. The resistance of dry skin is intermediate, although it varies greatly depending on the skin surface involved. Tissues with high resistance tend to heat up and coagulate in response to electrical flow.

- 77** Answer D. The patient has peripartum cardiomyopathy, which occurs in approximately 0.03% of all pregnancies and almost one third of patients die. Risk factors include greater maternal age, multiparity, and twin pregnancies. Clinical characteristics and acute management are the same as that of congestive heart failure due to a dilated cardiomyopathy. ECG, not cardiac catheterization, is usually the first step in

assessing structural cardiac abnormalities. Patients are at high risk of developing peripartum cardiomyopathy in subsequent pregnancies. Aspirin plays no role in management, although patients may benefit from heparin prophylaxis due to the thromboembolic risk.

- 78** Answer C. Choice C is also known as MDMA, or *ecstasy*. It is in a newly assigned class of drugs known as *entactogens*. These drugs have properties of both hallucinogens and amphetamines, causing mild hallucinations, increased interpersonal emotions, and stimulatory neurotransmitter release. Ecstasy is commonly ingested at raves and other dance parties. Pathophysiology includes sympathomimetic effects, hyperthermia, and hyponatremia (both from a central antidiuretic hormone (ADH)-like effect and increased thirst, causing water consumption). Choice A is lysergic acid diethylamine (LSD), which is not as commonly used currently as it was in the 1960s to 1980s. Choice B is PCP, causing an unpleasant psychosis and violence. Choice D is a selective serotonin reuptake inhibitor (SSRI) and choice E is a monoamine oxidase (MAO) inhibitor, neither of which is used recreationally.

- 79** Answer A. Open pelvic fractures, whether through the skin, vagina, or rectum, always require definitive operative management. Rectal violation of pelvic fragments requires laparotomy with colostomy. Bedside packing and antibiotics is indicated emergently but does not constitute definitive care. Angiography with embolization is useful in cases of life-threatening hemorrhage from unstable pelvic fractures, but has no role in the management of stable, open fractures. Bedside irrigation and suturing are not indicated. Foley catheter placement should be withheld in cases of pelvic fracture until physical examination demonstrates a low risk of urologic injury (absence of blood at the urethral meatus, perineal hematoma, or high-riding prostate).

- 80** Answer E. *H. pylori* is found in roughly 90% of patients with duodenal ulcers and 70% to 90% of patients with gastric ulcers. NSAID use, cigarette smoking and shock states are also risk factors for peptic ulcer disease. Although 200 proof alcohol has been shown to cause damage to the gastric mucosal epithelium in animals, there are no clinical studies demonstrating a link between alcohol use in humans and peptic ulcer disease. In fact, one study suggests a protective effect from modest alcohol ingestion. *H. pylori* infection is the most ubiquitous risk factor for peptic ulcer disease, regardless of the location of the ulcer. Eradication of *H. pylori* reduces ulcer recurrence from 75% if treated with acid-suppression

therapy alone to <20% in patients who undergo a course of anti-*Helicobacter* therapy. It is estimated that 50% of the U.S. population is colonized by *H. pylori* by the age of 50. However, only 15% to 20% of patients colonized with *H. pylori* will develop peptic ulcer disease over their lifetime. Therefore, other factors must be at work. In addition, details regarding different strains of *H. pylori* and their relative virulence are still being worked out.

81 Answer E. Patients with spinal stenosis are often elderly and constitute a small minority of patients with low back pain. Most patients present with subacute or chronic pain that frequently mimics symptoms of vascular claudication (often termed *neurogenic intermittent claudication*). This is problematic because vascular claudication strikes the same population. Symptoms of neurogenic intermittent claudication include buttock pain, which frequently radiates to the thighs and lower legs as well as cramping, paresthesias, back pain, and difficulty walking. In contrast to patients with vascular claudication, however, patients with spinal stenosis typically maintain a forward-leaning posture to reduce symptoms. In addition, patients are better able to walk uphill than downhill. Sitting also improves symptoms, which helps to differentiate patients with spinal stenosis from patients with disc herniation. Although patients may have involvement at several lumbar levels, L5 is most commonly involved (75%) followed by L4, L3, and L2.

82 Answer D. The patient has evidence of necrotizing fasciitis of the perineal area, commonly referred to as *Fournier's gangrene*. Fournier's gangrene is a systemic, life-threatening, polymicrobial infection, which requires intravenous antibiotics and surgical debridement. Intravenous immunoglobulin and hyperbaric oxygen therapy may be helpful in certain cases. Corticosteroids are not indicated except in cases of concomitant adrenal insufficiency. Antibiotics without surgical debridement are not sufficient for management. The diagnosis is usually made clinically—in unclear cases, CT, or MRI may aid the diagnosis but neither is 100% sensitive or specific. (Figure from Isaacs L. Necrotizing fasciitis: Diagnosis and treatment. *Emerg Med News*. 2002;24(8):4, with permission.)

83 Answer E. Core temperature afterdrop refers to the phenomenon of a further decline in core temperature after the initiation of warming. In the past, it has been blamed for the development of cardiac dysrhythmias and active external rewarming methods were thought to amplify the drop. However, afterdrop has not been shown to be of any clinical

importance and active external warming has not been shown to worsen the degree of afterdrop. Although the mechanism of afterdrop is still unclear, the leading current theory is based on conductive heat transfer from the warm core to the cool periphery. Despite the initiation of rewarming, a heat gradient remains from the relatively warm core to the cool periphery. Until this gradient is eliminated, heat transfer continues and the core temperature drops.

84 Answer B. Bupropion is an atypical antidepressant with dopamine reuptake inhibitory properties. Seizure is the most likely severe effect in overdose and can occur up to 24 hours after ingestion. Seizures can even occur in patients who are taking therapeutic doses of bupropion. They cannot be predicted by clinical or laboratory data and patients with bupropion overdose should be monitored for 24 hours postingestion. Coma, dysrhythmia, hypotension, and hypertension do not occur with bupropion and suggest coingestion of another drug.

85 Answer C. Anterior cord syndromes cause bilateral deficits in motor function and pain/temperature sensation below the level of injury. The lateral spinothalamic and the corticospinal tracts carry pain/temperature and motor fibers, respectively. The dorsal columns, carrying vibration, position, and fine touch sensation, are commonly spared. Cranial nerves arise directly out of the brainstem and are not commonly injured in cord syndromes except in rare circumstances. Causes of anterior cord syndrome include anterior spinal artery injury or infarction, spinal cord trauma, and intervertebral disk herniation. Prognosis is not as good as other causes of incomplete cord injuries.

86 Answer A. The rash is petechial in nature and combined with the history of starting on the wrists and ankles along with the nonspecific viral symptoms indicate the diagnosis of Rocky Mountain spotted fever (RMSF). This tick-borne illness is caused by *R. rickettsii*. Treatment of RMSF is with doxycycline and admission to the hospital. *Borrelia burgdorferi* is the causative bacterium of Lyme disease. Coxsackievirus causes herpangina and myocarditis. Gonococcus may cause a vesicular rash in association with septic arthritis, cervicitis, or pelvic inflammatory disease (PID). Meningococcus may cause a petechial rash with signs and symptoms of meningitis, but the onset is much more acute and severe than RMSF. (Figure from Habif TP. *Clinical dermatology: A color guide to diagnosis and therapy*. Philadelphia: Mosby; 2004, with permission.)

87 Answer B. Cerebral herniation syndromes are a result of severely increased ICP, usually because of trauma. Herniation occurs when the ICP causes downward movement of various parts of the brain through the foramen magnum. Mortality is virtually 100% in untreated patients. Uncal herniation is the most common type, and results from a lateral injury, causing the ipsilateral temporal lobe to be compressed against the tentorium cerebelli. The initial clinical manifestation is oculomotor nerve injury, causing ipsilateral ptosis, oculomotor dysfunction, and mydriasis. As the uncal herniation progresses, contralateral hemiparesis occurs. Eventually, the contralateral uncus is compressed, leading to bilateral decerebrate posturing, and the brainstem herniates, causing respiratory failure. In central transtentorial herniation, an expanding midline lesion causes bilateral pinpoint pupils, positive Babinski reflexes, and decorticate posturing. Cerebellotonsillar herniation results from a cerebellar hematoma, which causes the sudden onset of pinpoint pupils, and respiratory and cardiovascular compromise with complete, bilateral paralysis. Brainstem and medullary herniation is the common endpoint for all herniation syndromes and is manifested by respiratory arrest.

88 Answer D. The most common abnormal finding on CT scan in elderly patients with head trauma is cerebral contusion. Most of these patients have mild intraparenchymal capillary damage and are usually managed nonoperatively, with serial CT scans and neurologic exams to assess for deterioration. Epidural hematomas are less common in the elderly than in younger adults, as the dura is tightly adherent to the skull and does not usually expose arteries to shear forces. Subdural hematomas become much more common as patients get older because of brain atrophy, which stretches cranial bridging veins. Subarachnoid hemorrhage and cerebellar hematomas are less commonly seen in this population.

89 Answer A. In general, indications for replantation include multiple digit amputations, thumb amputations, wrist and forearm amputations, single digit amputations between the PIP and DIP joints, and any pediatric amputation. Amputations distal to the DIP joint are typically debrided and closed along with amputations proximal to the PIP. Amputations that are between the PIP (distal to the flexor digitorum superficialis insertion) and DIP joints tend to do well. However, single digit amputations are often considered unnecessary to replant. In addition, patients with underlying vascular disease, diabetes, congestive heart failure, or other medical problems may not have a good outcome even when the characteristics

of the amputation are encouraging for replantation. Finally, all patients with an amputation should wrap the amputated digit in saline soaked gauze, place the gauze in a ziplocked bag and place the bag on ice or in an ice-water bath. Freezing the digit should be avoided as it results in irreversible damage to cellular structures due to ice crystal formation.

90 Answer B. The majority of completed suicides among both men and women involve firearms. The presence of a firearm in the house is an independent risk factor for completed suicide and the patient should be directly asked about this on history. Drug ingestion, usually with antidepressants, is the most common method of suicide attempts, and the second most common method of completed suicide by women. Carbon monoxide poisoning is employed less often. Hanging is the second most common method of completed suicide by men. Wrist cutting almost never results in completed suicide.

91 Answer A. Nitroglycerin dilates the great veins and reduces preload. An acute reduction in preload may cause hypotension from decreased cardiac filling. Appropriate therapy involves fluid resuscitation and avoidance of further preload-reducing agents. Choices B, C, D, and E are all vasoactive agents that may be indicated if fluid therapy alone does not improve hypotension caused by nitrates.

92 Answer A. The single most common identifiable cause of seizures in human immunodeficiency virus (HIV)/AIDS patients is toxoplasmosis, which causes seizures through mass effect. Other mass lesions such as malignancy and abscess are additional causes. In cases that are not due to any identifiable cause, HIV-encephalopathy is postulated to be the etiology. Meningitis, usually cryptococcal, is the second most common identifiable cause. Electrolyte abnormalities, stroke, and neurosyphilis are less commonly implicated.

93 Answer C. Low molecular weight heparins (LMWHs) such as enoxaparin have been developed as a less-frequent dosing alternative to unfractionated heparin, which requires a constant IV drip and dosage monitoring. A major advantage of LMWHs is their ability to be used in outpatient anticoagulation regimens. The major mechanism of LMWHs is to inhibit factor X₂, causing a more upstream inhibition of the clotting cascade than unfractionated heparin, which binds to antithrombin III to inactivate thrombin (factor II). Inactivation of thrombin represents an additional, minor mechanism of LMWHs. Heparins do not function as direct platelet inhibitors,

although they can cause thrombocytopenia as an unintended side effect. Heparins do not directly affect von Willebrand factor or factor XIII.

- 94 Answer A. The clinical course of Guillain-Barré syndrome (GBS) is more severe in the elderly. In children with the disease, death is the exception, and rapid recovery is the rule. Overall, the mortality rate is between 4% and 15%, although 20% of survivors have some residual disability. Approximately 25% of patients have a preceding *C. jejuni* infection, and these patients typically experience a more severe course and delayed recovery. Autonomic involvement, resulting in urinary retention, ileus, postural hypotension, sinus tachycardia, and cardiac dysrhythmia is common and respiratory failure is more common in this group of patients. Ultimately, 25% of patients with GBS experience respiratory failure that requires mechanical ventilation.
- 95 Answer A. Although tarantula bites may inflict a significant amount of pain, there is usually minimal erythema and swelling at the bite site. Severe envenomation is extremely uncommon and fatalities have not been described in the United States. However, tarantulas are covered with "urticating hairs" that it can cast out toward a victim. The hairs become embedded in the skin and may cause an intense inflammatory response, resulting in pruritus and occasionally erythematous papules. After rubbing the area, patients may also unintentionally transfer the hairs to their eyes resulting in a severe keratoconjunctivitis that requires ophthalmologic referral for treatment and hair removal.
- 96 Answer B. The minimal rise in the β -hCG level of a viable intrauterine pregnancy is 53% over a 2-day period, although 85% of women will have an increase of >66%. Unfortunately, 21% of patients with ectopic pregnancy will exhibit a rise in their β -hCG level that mimics a normal intrauterine pregnancy. Furthermore, 10% of patients with ectopic pregnancy do not have abdominal pain. This patient's β -hCG level rose 78% in the 2 days since her previous visit (appropriate) and now exceeds the discriminatory threshold. Therefore, transvaginal ultrasonograph should reveal an intrauterine gestation, if one is present. If an intrauterine gestation is not seen, an OB consultation should be obtained. Because the patient is asymptomatic and her β -hCG level is rising appropriately, some practitioners would continue to check serial β -hCG levels until the level is more definitively above the discriminatory zone. However, many practitioners would evacuate the uterine contents and examine for the presence of chorionic villi. If none are

present, an ectopic pregnancy is presumed to be present and treated.

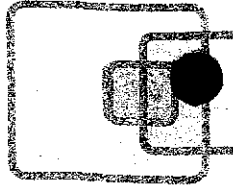
- 97 Answer C. In the setting of trauma, >90% of patients with a "posterior fat pad" sign have an intra-articular elbow injury. The most probable injury in children is a supracondylar fracture, whereas radial head fractures are the most common entity in adults. Although a small anterior fat pad is a common finding in healthy patients, a posterior fat pad is always an abnormal finding.
- 98 Answer C. ARF is a nonsuppurative complication of GAS pharyngitis that typically occurs 2 to 4 weeks after the initial pharyngeal infection. Its onset is characterized by the presence of fever plus one or more of the five "major" manifestations, including pancarditis, migratory arthritis, Sydenham's chorea, erythema marginatum, and subcutaneous nodules. A diagnosis of ARF is made in the setting of two of these five major Jones criteria and evidence of recent GAS infection, or one of the major criteria and two of the minor criteria (fever, arthralgias, and a history of prior rheumatic fever or rheumatic heart disease). Rheumatic fever is rare in patients older than 20 years. Treatment of acute GAS pharyngitis reduces the subsequent incidence of ARF. Scarlet fever is a consequence of acute GAS infection. Patients usually present with symptoms of GAS pharyngitis plus the presence of a diffuse maculopapular rash that has a fine, sandpaper-like feel (caused by an erythrogenic toxin). The rash typically begins in the inguinal creases before becoming quickly generalized. Shortly after generalization, the rash may become more intense along skin folds (e.g., in the antecubital fossa), producing lines of confluent petechiae known as Pastia's lines. The rash begins to fade 3 to 4 days after its onset, and enters a desquamative phase with flakes first peeling from the face and subsequently from the palms and fingers. The tongue is also involved, developing a white coat through which the tongue's erythematous papillae protrude giving the appearance of a "white strawberry" tongue. Treatment of scarlet fever is the same as for acute GAS pharyngitis. Severe scarlet fever with systemic toxic effects is not common.
- 99 Answer B. The triptans are serotonin 5-HT_{1B/1D} receptor agonists. Triptans are well tolerated though they have a number of irritating side effects, which include tingling, paresthesias, and sensations of warmth in the head, neck, chest, and limbs. Flushing, dizziness, and neck pain or stiffness occur less frequently. However, their use is limited because more frequent use results in rebound headache. In fact, this may occur with other abortive drugs, particularly butalbital.

Triptans can cause coronary artery constriction and may cause chest symptoms, which mimics angina pectoris. Although these symptoms may be frightening, they are rarely life threatening. However, there have been a few case reports of significant myocardial ischemia or infarction in patients using triptans. Therefore, the use of triptans should be considered contraindicated in the setting of ischemic heart disease, poorly controlled hypertension, and cerebrovascular disease.

100 Answer E. Viruses are the predominant etiology of pneumonia in children between the ages

of 4 months and 4 years. However, *S. pneumoniae* is the most common bacterial cause of pneumonia in this age-group. Although chest x-rays are unreliable in distinguishing between viral and bacterial pneumonias, this patient has an infiltrate, so it seems prudent to treat the patient with an antibiotic with antipneumococcal activity. Doxycycline and levofloxacin are contraindicated in children. Erythromycin, a macrolide antibiotic, would be a better choice for children older than 5 years or younger than 4 months since *M. pneumoniae* and *C. trachomatis* are the most common bacterial causes of pneumonia in these respective groups.

Test 2



Questions

1. Which of the following represents the characteristic acid-base disturbance seen in aspirin toxicity?
- (A) Respiratory alkalosis alone
 - (B) Metabolic acidosis alone
 - (C) Mixed respiratory alkalosis with metabolic acidosis
 - (D) Mixed respiratory acidosis with metabolic alkalosis
 - (E) No acid-base abnormality
2. The most common cause of acute mesenteric ischemia is
- (A) Thrombosis in the superior mesenteric artery (SMA).
 - (B) Mesenteric vein thrombosis.
 - (C) Nonocclusive mesenteric vascular disease.
 - (D) SMA embolism.
 - (E) Abdominal aortic aneurysm involving the SMA.
3. A 23-year-old woman presents with fever and sore throat for 3 days. She thinks she has strep throat. Which of the following findings is more characteristic of streptococcal pharyngitis than viral pharyngitis?
- (A) Runny nose
 - (B) Odynophagia
 - (C) Absence of cough
 - (D) Conjunctivitis
 - (E) Bilateral tonsillar enlargement
4. Which of the following is true regarding posterior shoulder dislocations?
- (A) External rotation is usually intact.
 - (B) Neurovascular injury is more common than in anterior dislocations.
 - (C) The absence of pain excludes the diagnosis.
 - (D) Seizures are a common mechanism of injury.
 - (E) Recurrent injury is more common than in anterior dislocations.
5. Which of the following is the number one cause of death in patients with congestive heart failure (CHF)?
- (A) Progressive hemodynamic deterioration
 - (B) Urinary tract infection (UTI)
 - (C) Pneumonia
 - (D) Stroke
 - (E) Pulmonary embolism
6. Which of the following is true regarding electrical injury?
- (A) Direct current (DC) is more dangerous than alternating current (AC).
 - (B) In high-voltage injuries, the extent of cutaneous burns is a good predictor of internal tissue damage.
 - (C) Asystole is the most common dysrhythmia resulting from low-voltage electrical injury.
 - (D) In contrast to other multi-victim traumatic events, patients without signs of life should be resuscitated first.
 - (E) All of the above.
7. A 55-year-old woman presents with left knee pain after being struck at 5 miles per hour by a car turning into her pedestrian lane. Her knee is significantly tender inferior and lateral to the patella. She is able to fully extend her leg with pain and her neurovascular and ligamentous exams are intact. Knee radiographs are normal. Which of the following is the most appropriate next step in management?
- (A) Discharge with full weight bearing
 - (B) Discharge with crutches and weight bearing as tolerated
 - (C) Computed tomography (CT) scan of the knee
 - (D) Admit for knee observation
 - (E) Urgent arthroscopy
8. Which of the following is true regarding treatment of otitis media?
- (A) Few cases will resolve spontaneously without antibiotics.
 - (B) Oral antibiotics are superior to intramuscular (IM) antibiotics in efficacy of treatment.
 - (C) High-dose amoxicillin (80 mg/kg/day) should be reserved for those patients who are older than 2 years of age.

- (D) Otitis media represents the number one reason for outpatient antimicrobial prescriptions in the United States.
- (E) Auralgan may be beneficial in patients with tympanic membrane perforations.
- 9** A 68-year-old man with a history of chronic obstructive pulmonary disease (COPD) presents to the emergency department (ED) with worsening dyspnea, cough, and subjective intermittent fevers. He tells you that he spent 1 week in the intensive care unit (ICU) 6 months ago after being intubated for a similar episode and states "I don't ever want to be intubated again." You discuss the use of noninvasive positive pressure ventilation with him (bilevel positive airway pressure [BiPAP]) and he is agreeable. With which of the following comorbidities is BiPAP safe to use?
- (A) Excessive secretions
- (B) Decreased sensorium
- (C) Hypertension
- (D) Midfacial trauma
- (E) Uncooperative patient
- 10** A 44-year-old woman presents with right leg pain. She has noticed increasing pain in the middle of her tibia over the last few weeks since she started training for a marathon. Physical examination of the entire lower extremity is normal except for mild tenderness to palpation in the area of pain. Radiographs of the tibia are normal. Which of the following is true regarding this patient's condition?
- (A) Most cases require surgery for definitive management.
- (B) Bone scan has higher sensitivity than plain radiographs.
- (C) Magnetic resonance imaging (MRI) is indicated to evaluate for complications.
- (D) Men are at higher risk than women.
- (E) The femur is the most common bone involved.
- 11** Thirty minutes after a 35-year-old woman presents to the ED with a severe asthma exacerbation, you intubate her because she is showing signs of fatigue and ventilatory failure. You use ketamine and succinylcholine and pass the endotracheal through the vocal cords without difficulty. A colleague who is assisting you aggressively "bags" the patient until the respiratory therapist connects the mechanical ventilator. Thirty seconds after intubation, the nurse reports that the patient's blood pressure (BP) has dropped to 93/46. Her BP before intubation was 138/80. The patient has an 18-gauge peripheral intravenous (IV) line in her left antecubital fossa and her trachea appears midline. What is the best course of action?
- (A) Ask the nurses to place a second large bore peripheral IV and immediately bolus the patient with 2 L of normal saline.
- (B) Extubate the patient and deliver breaths using a bag-valve mask.
- (C) Disconnect the ventilator but keep the endotracheal tube (ETT) in place and allow the patient to exhale.
- (D) Ask the nurses to start a dopamine drip at 5 $\mu\text{g}/\text{kg}/\text{minute}$.
- (E) Perform an immediate needle thoracostomy.
- 12** A 54-year-old man with a history of chronic alcohol abuse is brought in by his wife because of a "big stomach" and confusion. She tells you his stomach has been big for 1 year but over the last month he seems to be forgetting things, has difficulty sleeping, and is not tending to his own appearance. Which of the following is true?
- (A) Ammonia levels correlate with the severity of his illness.
- (B) The most common finding on CT of the brain is hydrocephalus.
- (C) Spontaneous bacterial peritonitis is the most common precipitant.
- (D) Gastrointestinal (GI) bleeding may exacerbate or trigger this condition.
- (E) The treatment of choice is ceftriaxone.
- 13** A patient presents with new-onset psychosis. Which of the following suggests a medical, rather than psychiatric, cause for the symptoms?
- (A) Auditory hallucinations
- (B) Age <35
- (C) Gradual onset
- (D) Aphasia
- (E) Flat affect
- 14** Which of the following is more characteristic of migraine headaches than cluster headaches?
- (A) The pain is unilateral.
- (B) Pain is of moderate to severe intensity.
- (C) The pain is throbbing in quality.
- (D) The pain responds to sumatriptan.
- (E) The patient has a concomitant upper respiratory infection.
- 15** A 38-year-old pregnant woman presents to the ED with abdominal pain radiating to the back and vaginal bleeding. She is 25 weeks by dates and has had an uncomplicated pregnancy with routine prenatal care. She admits to smoking one pack of cigarettes per day and otherwise has no significant history. Her uterus is firm and tender on examination and there is bright

red blood oozing from the cervical os. The most likely diagnosis is

- (A) Appendicitis.
- (B) Placenta previa.
- (C) Vasa previa.
- (D) Fibroid degeneration.
- (E) Abruptio placentae.

16 What is the duration of action of naloxone?

- (A) 30 minutes
- (B) 1 hour
- (C) 5 hours
- (D) 10 hours
- (E) 20 hours

17 Which of the following is true regarding hypokalemia?

- (A) Patients with a recent myocardial infarction (MI) are at increased risk for ventricular arrhythmias if the $[K^+]$ < 4.0 mEq per L.
- (B) The presence of U waves and ST-segment depression on electrocardiograms (EKGs) correlates with the severity of hypokalemia.
- (C) Neurologic problems are the most common manifestations of hypokalemia.
- (D) Vomiting or nasogastric suctioning may lead to profound hypokalemia.
- (E) Potassium is the most prominent extracellular cation.

18 Which of the following is true regarding orbital cellulitis?

- (A) Pain with extraocular movements is a characteristic finding.
- (B) Hematogenous spread of bacteria commonly occurs.
- (C) Sinusitis is an uncommon predisposing factor.
- (D) *Aspergillus* is a common cause of acute disease.
- (E) Periorbital cellulitis often spontaneously progresses to involve the orbit.

19 Which of the following is the most commonly ingested alcohol after ethanol?

- (A) Methanol
- (B) Ethylene glycol
- (C) Isopropanol
- (D) Propylene glycol
- (E) Acetone

20 A mother brings in her 12-year-old son with a chief complaint of alopecia. The patient denies any complaints and has been well recently. The lesion is shown in Figure 2-1. Which of the following is the treatment of choice?

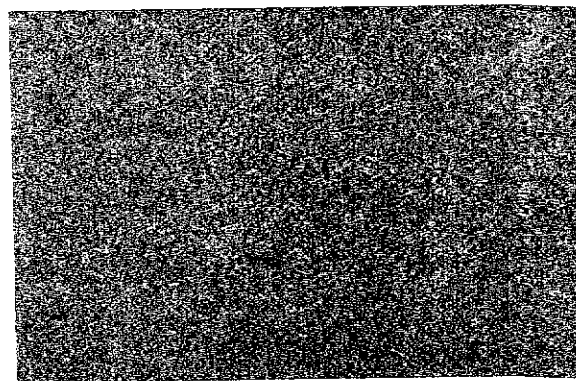


Figure 2-1.

- (A) 2.5% selenium sulfide shampoo
- (B) Clotrimazole cream
- (C) High-dose amoxicillin (80 to 90 mg per kg divided b.i.d.)
- (D) Terbinafine lotion
- (E) Oral griseofulvin

21 Which of the following is true about pilonidal abscesses?

- (A) They are more common in women.
- (B) They are more common in hairless patients.
- (C) Recurrence after incision and drainage is uncommon.
- (D) Longitudinal incisions should be made off of the sacral midline.
- (E) All of the above.

22 Which of the following is true regarding acute salicylate toxicity?

- (A) Treatment should be instituted in strict accordance with the Done nomogram.
- (B) Initial symptoms of toxicity are tinnitus and altered hearing.
- (C) Metabolic alkalosis is characteristic.
- (D) Significant bleeding through the GI tract is present in most patients.
- (E) Life-threatening hyperkalemia may occur.

23 The manifestations of hyperphosphatemia are related to its effects on:

- (A) Sodium
- (B) Potassium
- (C) Magnesium
- (D) Calcium
- (E) Chloride

24 Which of the following is true about primary spontaneous pneumothorax?

- (A) Most patients develop primary pneumothorax during vigorous exercise.

- (B) Expiratory chest x-rays are critical to make a diagnosis.
- (C) It is typically a less dangerous finding than primary spontaneous pneumomediastinum.
- (D) Hamman's crunch is pathognomonic for the diagnosis.
- (E) Smoking is the most significant risk factor.
- 25** Among trauma patients, which of the following is the most common incomplete spinal cord syndrome?
- (A) Brown-Séquard syndrome
- (B) Central cord syndrome
- (C) Anterior cord syndrome
- (D) Posterior cord syndrome
- (E) Conus medullaris syndrome
- 26** Radiation enteritis . . .
- (A) Has a mortality rate of 75% in its acute form.
- (B) Presents most commonly in its chronic form.
- (C) Occurs more than 2 years after completion of radiotherapy in 10% of patients.
- (D) Is best diagnosed with CT of the abdomen and pelvis with oral and IV contrast.
- (E) Is all of the above.
- 27** Which of the following toxins is suggested by the smell of garlic?
- (A) Cyanide
- (B) Zinc
- (C) Toluene
- (D) Organophosphate
- (E) Hydrogen sulfide
- 28** A 25-year-old woman presents to the ED with thumb pain after a skiing accident in which she fell with her thumb caught in the straps of her pole. Which of the following is most likely true?
- (A) She should be placed in a thumb spica splint.
- (B) She has torn the ulnar collateral ligament (UCL) at the thumb metacarpophalangeal (MCP) joint.
- (C) She will have difficulty with pinching and grasping.
- (D) The presence of a Stener lesion mandates operative repair.
- (E) All of the above.
- 29** Which of the following is true about upper gastrointestinal bleeding (UGIB) due to peptic ulcer disease (PUD)?
- (A) In patients with normal GI anatomy, hematochezia will not occur.
- (B) Bleeding will stop spontaneously in 70% to 80% of patients.
- (C) Most patients will present with isolated melena.
- (D) The mortality rate of bleeding due to a peptic ulcer is 25%.
- (E) Perforation may be accompanied by hemorrhage in 50% of cases.
- 30** A 28-year-old man presents to the ED with an extensive vesicular, weeping, and crusted eruption arranged in a linear pattern on his lower legs. He tells you that he cleaned out the brush from the woods behind his house a couple of days ago. You suspect he has a contact dermatitis due to poison ivy. In addition to cool compresses and antihistamines to help control pruritus, the ideal course of corticosteroids should be
- (A) Topical triamcinolone until resolution.
- (B) Three days of oral prednisone.
- (C) A commercially available steroid dose pack (e.g., Medrol Dosepak).
- (D) At least 14 days of oral prednisone.
- (E) Corticosteroids are unnecessary in most cases of poison ivy induced contact dermatitis.
- 31** A 23-year-old man with a past medical history of acquired immunodeficiency syndrome (AIDS) presents with fever and headache. Brain CT scan is unremarkable and cerebrospinal fluid results from lumbar puncture results are shown in the subsequent text:
- | | |
|-------------------------|---|
| White blood cell (WBC): | 35 per μL , lymphocytic predominance |
| Red blood cell (RBC): | 2 per μL |
| Glucose: | Normal |
| Protein: | Normal |
| Gram stain: | Negative |
| India ink: | Positive |
- Which of the following is the most appropriate medication at this time?
- (A) Ceftriaxone
- (B) Vancomycin
- (C) Acyclovir
- (D) Itraconazole
- (E) Amphotericin B + flucytosine
- 32** A 34-year-old woman has a hemoglobin level of 10.0 g per dL with a low mean corpuscular volume. Which of the following is the most likely cause?
- (A) α -Thalassemia
- (B) β -Thalassemia
- (C) Iron-deficiency anemia
- (D) Sideroblastic anemia
- (E) Folate deficiency
- 33** A 47-year-old woman presents with a severe occipital headache and a general feeling of malaise. Her

neurologic examination is normal. A stat head CT is shown in the image (see Fig. 2-2). Which of the following is true about this patient?

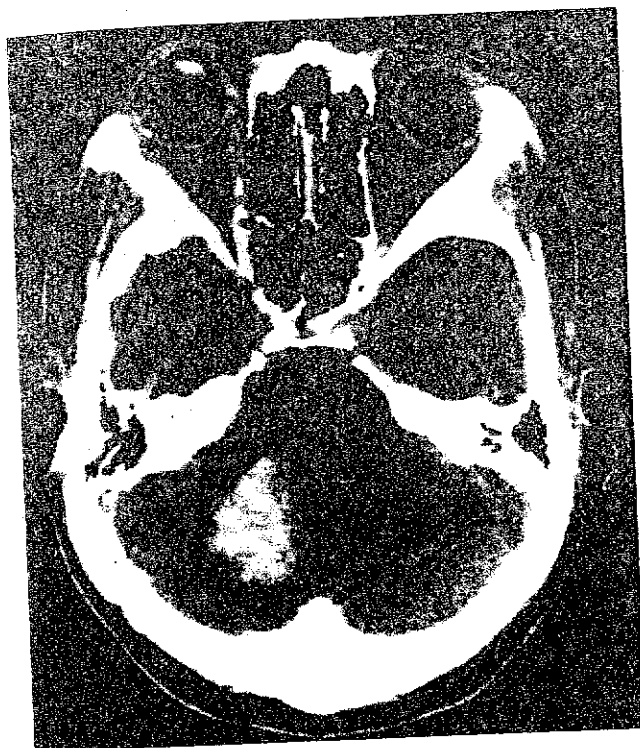


Figure 2-2.

- (A) The development of hydrocephalus requires urgent neurosurgical intervention.
- (B) The patient should be given stat IV corticosteroids and loaded with an anticonvulsant.
- (C) Such patients often succumb to uncus herniation.
- (D) A systolic blood pressure (SBP) of 90 mm Hg is probably due to the Cushing response.
- (E) All of the above.
34. Which of the following is true about appendicitis in adult women?
- (A) Pregnant women are twice as likely as nonpregnant women to develop appendicitis.
- (B) Cervical motion tenderness (CMT) rules out appendicitis.
- (C) Even in the third trimester, most pregnant women still have pain in the right lower quadrant.
- (D) Owing to anatomic changes, appendicitis in pregnant women occurs most often in the third trimester.
- (E) Fetal abortion occurs in 50% of pregnant women with perforated appendicitis.
35. Which of the following is true regarding spontaneous abortion?
- (A) Patients diagnosed with threatened abortion should not receive anti-D immunoglobulin (RhoGAM) because the antibody may provoke an immune response to the live fetus.
- (B) When a fetal heartbeat is seen on ultrasonograph, patients diagnosed with threatened abortion will experience a spontaneous miscarriage 50% of the time.
- (C) Patients diagnosed with threatened abortion should be placed on bedrest restrictions until the bleeding resolves.
- (D) All patients who present to the ED with fetal or placental tissue and resolution of vaginal bleeding can be diagnosed with a complete abortion and discharged.
- (E) Up to 80% of women with first trimester spontaneous abortion complete the abortion without intervention.
36. Which of the following radiographic views of the knee best identifies longitudinal patellar fractures?
- (A) Anteroposterior (AP)
- (B) Lateral
- (C) Medial oblique
- (D) Lateral oblique
- (E) Sunrise
37. In patients older than 85 years, which of the following is the most common symptom during MI?
- (A) Chest pain
- (B) Dyspnea
- (C) Syncope
- (D) Altered mental status
- (E) Fever
38. Which of the following is the best adjunct to the physical examination in assessing the severity of an asthma attack?
- (A) Arterial blood gas (ABG)
- (B) Peak Expiratory Flow Rate (PEFR)
- (C) Chest x-ray
- (D) Continuous cardiac monitoring
- (E) FEV₁ (forced expiratory volume in one second, expressed as liters per second)

- 39 How long after a toxic acetaminophen ingestion does N-acetylcysteine (NAC) still result in 100% prevention of hepatic injury?
- (A) 2 hours
 - (B) 4 hours
 - (C) 8 hours
 - (D) 12 hours
 - (E) 24 hours
- 40 Which of the following is true regarding control of hypertension and stroke?
- (A) Patients with both ischemic and hemorrhagic strokes should have their BP reduced to a SBP of 140 to 160 mm Hg or prestroke levels.
 - (B) BP should not be controlled in any stroke patient unless the patient is a candidate for tissue plasminogen activator (tPA).
 - (C) Only patients with ischemic infarcts should have their BP reduced to a target SBP of 140 to 160 mm Hg or prestroke levels.
 - (D) Only patients with intracerebral hemorrhage should have their BP reduced to a target SBP of 140 to 160 mm Hg or prestroke levels.
 - (E) All stroke patients who experience clinical deterioration in the ED should have emergent BP control to a target SBP of 140 to 160 mm Hg or prestroke levels.
- 41 A 17-year-old basketball player collapses and dies while playing a game. Which of the following is the most likely cause?
- (A) Coronary artery disease
 - (B) Pulmonary embolism
 - (C) Hypertrophic cardiomyopathy
 - (D) Subarachnoid hemorrhage (SAH)
 - (E) Spontaneous pneumothorax
- 42 A 37-year-old previously healthy woman is brought to the ED by her family with a complaint of fever, headache, confusion, and lethargy. Empiric antibiotics for community-acquired meningitis were started and a CT scan was performed which was negative. Before getting a bed, her lumbar puncture revealed the following: WBC 412 per mm³ with a differential of 98% lymphocytes, protein 120 mg per dL, glucose normal. Which of the following should be added to her regimen?
- (A) Acyclovir
 - (B) Ampicillin
 - (C) Dexamethasone
 - (D) Amphotericin B
 - (E) None of the above.
- 43 The most common cause of bacterial arthritis in adults is
- (A) *Staphylococcus aureus*.
 - (B) *Neisseria gonorrhoeae*.
 - (C) *Streptococcus pyogenes*.
 - (D) *Hemophilus influenzae*.
 - (E) Polymicrobial.
- 44 A 23-year-old man presents after being assaulted by several men. Per eyewitness report, the patient was kicked and struck with a baseball bat several times. The patient is brought in on backboard and cervical collar. He is extremely agitated and combative, punching and kicking staff and climbing off the bed. He is yelling, "I want to get out of here!" when any question is asked of him. He appears to be moving every extremity except his left arm. You complete the primary survey, which is intact except for the paralyzed left arm. His vital signs are 98.0, 95, 22, 166/94, and 98% RA. Which of the following is the most appropriate next step in management?
- (A) CT brain
 - (B) MRI brain
 - (C) CT cervical spine
 - (D) MRI cervical spine
 - (E) Rapid sequence intubation
- 45 A 25-year-old woman presents with white vaginal discharge. Physical examination demonstrates grayish-white discharge with no cervical lesions. A wet mount is positive for the presence of clue cells. Which of the following is best therapy for this patient?
- (A) Fluconazole 150 mg PO once
 - (B) Metronidazole 2 g PO once
 - (C) Clindamycin 300 mg b.i.d. for 7 days
 - (D) Ceftriaxone 125 mg IM once
 - (E) Azithromycin 1 g PO once
- 46 Which of the following is true regarding the peripheral WBC count?
- (A) Elevation in the WBC count is specific for an infectious process.
 - (B) The presence of 95% neutrophils is also known as a left shift.
 - (C) Exercise can elevate the WBC count to more than 15,000 cells per mm³.
 - (D) The degree of leukocytosis distinguishes between viral and bacterial infection.
 - (E) A WBC count >50,000 cells per mm³ is specific for chronic myeloid leukemia.

47 Which of the following is true regarding physostigmine?

- (A) It is the drug of choice to treat most anticholinergic crises.
- (B) It affects muscarinic, but not nicotinic receptors.
- (C) It affects nicotinic, but not muscarinic receptors.
- (D) It is able to cross the blood-brain barrier.
- (E) It should be rapidly pushed to achieve clinical effect.

48 An 8-year-old boy is brought in by his parents after apparently ingesting a pin. He looks well and has a normal physical examination. A flat plate of the abdomen is shown in Figure 2-3. Which of the following is true?



Figure 2-3.

- (A) The most common site of perforation is the ileocecal valve.
- (B) Perforation occurs in 50% of cases.
- (C) Emergent consultation to a pediatric gastroenterologist is required for endoscopic removal.
- (D) The patient can be safely discharged home with follow-up with his pediatrician.
- (E) The patient's parents should give consent for an emergent laparotomy for surgical removal.

49 A 9-year-old man presents with right eyelid swelling, pain, and redness, progressively worsening over 3 days. He does not report blurry vision. Which of the following is more characteristic of orbital cellulitis than periorbital cellulitis?

- (A) Fever
- (B) Periorbital edema
- (C) Eye tenderness
- (D) *S. aureus* as the etiologic agent
- (E) Restricted eye movement

50 A 5-year-old boy presents with bloody diarrhea for several days, followed by fatigue, pallor, and malaise. Several kids at school have similar complaints. Blood tests at his pediatrician's office demonstrate severe anemia, thrombocytopenia, and renal insufficiency. Which of the following is the most likely cause?

- (A) *Shigella*
- (B) *Salmonella*
- (C) *Escherichia coli*
- (D) Rotavirus
- (E) Child abuse

51 Which of the following is true regarding transient ischemic attack (TIA)?

- (A) Neurologic findings in patients with TIAs are more commonly "positive" (tingling or involuntary movements) than "negative" (aphasia, weakness, numbness).
- (B) A "march" of symptoms affecting various body parts in succession is common in TIAs.
- (C) TIA was recently redefined as transient neurologic dysfunction that resolves within 1 hour.
- (D) Confusion and generalized weakness are common in patients with a TIA.
- (E) The most common mimic of symptoms caused by a TIA is a complicated migraine.

52 A 23-year-old woman is struck in the eye with a soccer ball. Penlight eye examination is shown in Figure 2-4. Which of the following is the most appropriate next step in management?

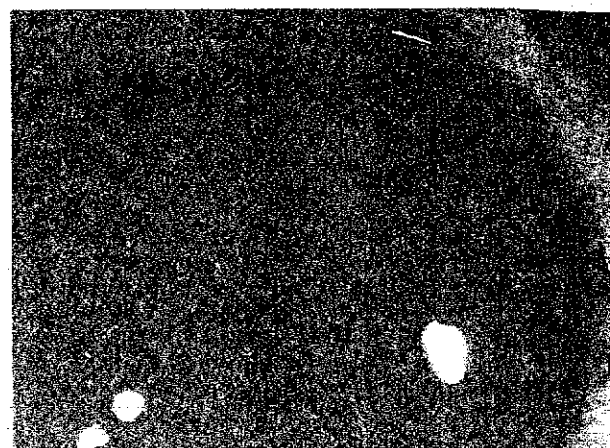


Figure 2-4.

- (A) Trendelenburg positioning
 - (B) Ibuprofen for pain
 - (C) Activated factor VII
 - (D) Eye shielding
 - (E) IV antibiotics
- 52 The agent of choice to inactivate coelenterate nematocyst toxin (such as jellyfish) is
- (A) 5% acetic acid (vinegar).
 - (B) Ambient temperature fresh water.
 - (C) Ambient temperature seawater.
 - (D) Ammonia.
 - (E) Alcohol.
- 53 Which of the following is the most common presenting symptom of multiple sclerosis (MS)?
- (A) Urinary retention
 - (B) Hemiparesis of the upper extremities
 - (C) Ataxia
 - (D) Aphasia
 - (E) Eye pain and monocular visual loss
- 54 Which of the following is true regarding *Mycoplasma pneumoniae* infections?
- (A) The presence of bullous myringitis is central to making a diagnosis of *M. pneumoniae*.
 - (B) Outbreaks are common in institutional settings such as camps and military bases.
 - (C) Neurologic complications occur in up to 30% of patients.
 - (D) Cold agglutinin titers rise within 1 to 2 days of infection with *M. pneumoniae*.
 - (E) *Mycoplasma* is the most frequent cause of community-acquired pneumonia in elderly patients older than 65.
- 55 A 65-year-old man presents with fever, chills, and dysuria for 2 days. He denies vomiting or back pain. Physical examination reveals a patient in mild discomfort, with normal cardiac, pulmonary, and abdominal examinations. He lacks costovertebral angle tenderness, but rectal examination reveals a boggy, tender prostate. Which of the following is the most appropriate therapy?
- (A) Ceftriaxone 125 mg IM and doxycycline 100 mg PO b.i.d. for 10 days
 - (B) Azithromycin 1 g PO
 - (C) Ciprofloxacin 500 mg PO b.i.d. for 3 days
 - (D) Ciprofloxacin 500 mg PO b.i.d. for 7 days
 - (E) Ciprofloxacin 500 mg PO b.i.d. for 30 days
- 56 Which of the following has the highest sensitivity for acute MI in the first 2 hours?
- (A) Troponin I
 - (B) Troponin T
 - (C) Myoglobin
 - (D) CK-MB
 - (E) Total creatine phosphokinase (CPK).
- 57 The best route and location of epinephrine administration for anaphylaxis is
- (A) IM in the deltoid.
 - (B) Subcutaneous (SQ) in the deltoid.
 - (C) IM in the lateral thigh.
 - (D) SQ in the lateral thigh.
 - (E) There is no preferable route.
- 58 A 15-year-old boy presents with progressively worsening groin and scrotal pain and swelling over the last 8 hours. He noticed a bulge in his scrotum the day before when he lifted a heavy object. Physical examination demonstrates an afebrile patient with moderate tenderness and fullness, with bowel sounds present in his right hemiscrotum. The testes are not tender or enlarged. Which of the following is the most appropriate next step in management?
- (A) Ice pack to the groin
 - (B) Immediate operative reduction
 - (C) Outpatient urology referral
 - (D) Oral hydration
 - (E) Urinalysis
- 59 Which of the following is true regarding adrenal insufficiency?
- (A) Patients with secondary adrenal insufficiency frequently have hyperpigmentation.
 - (B) Hypernatremia is the most common electrolyte abnormality.
 - (C) Hyperkalemia is a common side effect of prednisone or hydrocortisone therapy.
 - (D) Nausea and vomiting are present in >50% of patients.
 - (E) All of the above.
- 60 A 26-year-old woman is brought to the ED after a motor vehicle accident in which she was thrown from the vehicle. Initial evaluation reveals a confused patient with multiple scalp wounds and vital signs of P 130, BP 85/55. After intubation and fluid resuscitation, initial plain films reveal clear lungs but an obvious pelvic fracture. Diagnostic peritoneal lavage (DPL) reveals a grossly positive tap (aspiration). Which of the following is the next step in management?
- (A) Abdominal CT to better determine the need for laparotomy.
 - (B) Pelvic angiography.
 - (C) Thoracotomy with cross clamping of the aorta.
 - (D) Exploratory laparotomy.

- (E) Use DPL cell counts to determine the need for laparotomy.
- 62 Which of the following is the most common cause of pleural effusion in the United States?
- (A) Cancer
 - (B) Tuberculosis
 - (C) Pneumonia
 - (D) CHF
 - (E) Pancreatitis
- 63 Which of the following is the most common complication of acute sinusitis?
- (A) Maxillary cellulitis
 - (B) Cavernous sinus thrombosis
 - (C) Meningitis
 - (D) Preseptal cellulitis
 - (E) Orbital cellulitis
- 64 Which of the following is true regarding labetalol?
- (A) Effect on α -receptors is greater than that on β -receptors.
 - (B) Reflex tachycardia is a common complication.
 - (C) Orthostatic changes with IV use are rare.
 - (D) BP is more easily controlled than with nitroprusside.
 - (E) It is superior to nitroprusside as monotherapy for aortic dissection.
- 65 A 55-year-old woman presents with a laceration on her arm after falling while riding her bicycle. She does not know the last time she had a tetanus booster, but wants to know why she should have one. Which of the following is true regarding tetanus?
- (A) Mortality for clinically evident tetanus is almost 50%.
 - (B) All patients with tetanus have a history of preceding injury.
 - (C) Wound cultures are helpful for diagnostic screening.
 - (D) Cardiac dysrhythmia is the most common cause of death.
 - (E) Tetanus boosters should be updated every year with clean wounds.
- 66 A 64-year-old woman with small cell lung cancer presents with a chief complaint of fatigue, dizziness, and imbalance. Her blood work is significant for a sodium level of 112 mmol per L. You suspect she has a syndrome of inappropriate secretion of antidiuretic hormone (SIADH) due to her lung cancer. Administering normal saline to this patient will likely:
- (A) Slowly correct her sodium level.
 - (B) Result in central pontine myelinolysis.
 - (C) Worsen her hyponatremia.
 - (D) Suppress further antidiuretic hormone (ADH) secretion.
 - (E) Make no difference in her sodium level and cause water retention and edema.
- 67 A 40-year-old man presents with testicular pain for 2 days and fever of 101°F. He also complains of dysuria, but denies scrotal edema, flank pain, nausea, or vomiting. Physical examination demonstrates moderate tenderness with mild edema and erythema in the scrotal area. Cremasteric reflexes are present bilaterally. A testicular ultrasound is performed and is negative for torsion. Which of the following is the most likely etiology of the patient's symptoms?
- (A) Viral
 - (B) *Chlamydia*
 - (C) *N. gonorrhoeae*
 - (D) *E. coli*
 - (E) *Pseudomonas aeruginosa*
- 68 A 23-year-old woman presents with pain in her right lateral chest after a low-speed motor vehicle collision. She is most tender in the fifth rib at the posterior axillary line. Which of the following is the most appropriate next step in evaluation?
- (A) Chest x-ray
 - (B) Rib x-rays
 - (C) CT abdomen/pelvis
 - (D) CT brain
 - (E) Cervical spine radiographs
- 69 Peritonsillar abscess (PTA) refers to a collection of pus adjacent to which of the following structures?
- (A) Palatine tonsil
 - (B) Pharyngeal tonsil
 - (C) Lingual tonsil
 - (D) All of the above
 - (E) None of the above
- 70 The daughter of an 82-year-old woman brings her mother in with a chief complaint of a "foreign body" in her vagina (see Fig. 2-5). The patient had reported the uncomfortable sensation of sitting on a ball and of something "falling out" of her vagina. Which of the following is the next best step in management?
- (A) Consultation with obstetrics and gynecology (OB-GYN) for immediate hysterectomy.
 - (B) Discharge the patient with a prescription for metronidazole and an appointment with OB-GYN in 2 days.
 - (C) Manually reduce the mass.

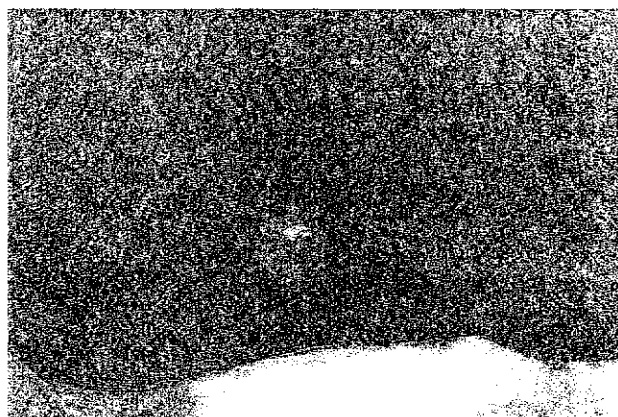


Figure 2-5.

- (D) Incision and drainage of the mass.
(E) None of the above.
- 71** Which of the following opioids may predispose to QRS prolongation?
- (A) Fentanyl
(B) Meperidine
(C) Propoxyphene
(D) Hydrocodone
(E) Morphine
- 72** Which of the following cervical vertebral levels exhibit pseudosubluxation in almost half of all pediatric patients?
- (A) C1-2
(B) C2-3
(C) C3-4
(D) C4-5
(E) C5-6
- 73** A 63-year-old woman is brought to the ED by her children because she is lethargic and has labored breathing. They last saw her 4 days ago when she seemed well. Her vital signs are T 101.8°F, HR 120 per minute, RR 32 per minute and a PO₂ value of 89% on 100% oxygen by face mask. She is intubated and placed on assist-control ventilation. A subsequent chest x-ray reveals diffuse bilateral infiltrates, and normal heart size. You suspect she has severe pneumonia and acute respiratory distress syndrome (ARDS). Which of the following summarizes the best ventilation strategy in patients with ARDS?
- (A) Owing to low compliance, patients with ARDS need higher tidal volumes and higher positive end-expiratory pressure (PEEP) to ensure adequate ventilation.
(B) Owing to significant airway obstruction, such patients require very low or no PEEP similar to asthma patients to avoid air trapping.
(C) Owing to high compliance, such patients require lower tidal volumes and lower PEEP to improve oxygenation.
(D) Owing to low compliance, such patients require lower tidal volumes and higher PEEP to avoid barotrauma.
(E) Owing to high compliance, patients with ARDS do not require PEEP.
- 74** Which of the following is true regarding allergic reactions?
- (A) Like infants, many adults with food allergies will outgrow their allergies over time.
(B) Patients allergic to honeybee stings will also have similar reactions to wasp stings.
(C) Most adverse drug reactions are allergic.
(D) Oral allergen exposure provokes a stronger anaphylactic response than topical exposure.
(E) Atopy predisposes patients to develop anaphylaxis.
- 75** Which of the following is the most common initial dysrhythmia in symptomatic patients with Wolff-Parkinson-White (WPW) syndrome?
- (A) Multifocal atrial tachycardia (MAT)
(B) Atrioventricular (AV) nodal reentrant tachycardia
(C) Mobitz type I second-degree AV block
(D) Mobitz type II second-degree AV block
(E) Torsade de pointes
- 76** Which of the following is true regarding laboratory testing in patients with abdominal trauma?
- (A) Liver enzymes are used to help distinguish minor contusions from high-grade lacerations.
(B) Elevated serum amylase and lipase are always indicative of pancreatic injury.
(C) Microscopic hematuria usually indicates a need for abdominal CT scanning in pediatric blunt trauma patients.
(D) The hematocrit is only useful when serial measurements are conducted.
(E) None of the above.
- 77** Which of the following is a positive prognostic sign in patients with frostbite?
- (A) Violaceous color after rewarming
(B) Lack of edema formation

- (C) Woody firmness of the SQ tissue
- (D) Early formation of clear blebs in the affected tissue
- (E) None of the above

78 Which of the following is the most useful historic detail to distinguish chest pain caused by coronary ischemia versus that caused by gastroesophageal reflux (GERD)?

- (A) Radiation of pain to the jaw
- (B) Emotional precipitation of pain
- (C) Precipitation of pain by exercise and relief by rest
- (D) Radiation of pain to the back
- (E) None of the above

79 A 32-year-old man presents with eye pain and redness. Slit lamp examination is shown in Figure 2-6. Which of the following is the most appropriate next step in management?

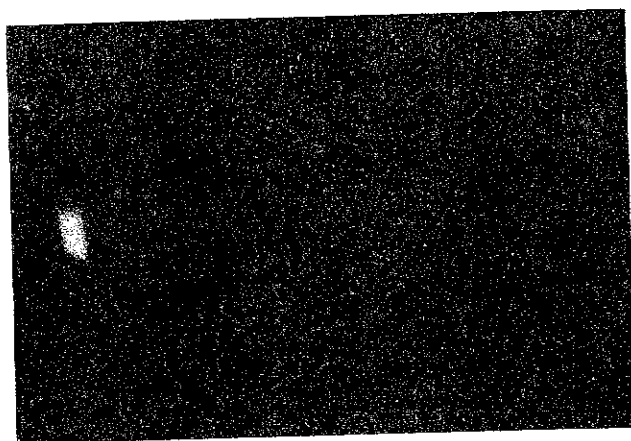


Figure 2-6.

- (A) Topical prednisolone
- (B) Valacyclovir PO
- (C) Acetazolamide IV
- (D) Erythromycin PO
- (E) Ceftriaxone IV

80 Which of the following animals confers the highest risk of transmitting rabies?

- (A) Squirrel
- (B) Skunk
- (C) Hamster
- (D) Chipmunk
- (E) Rabbit

81 A 32-year-old woman G₃P₂ at 39 weeks' gestation presented to your community ED in active labor

with a fully dilated cervix. Because your hospital has no obstetrics services, you prepare for delivery. One minute after a successful and apparently uneventful delivery, the patient becomes abruptly hypoxic, severely hypotensive with a BP of 76/palp and obtunded. The most likely diagnosis is

- (A) Sepsis.
- (B) Pulmonary embolism.
- (C) Peripartum cardiomyopathy.
- (D) Amniotic fluid embolism (AFE).
- (E) Eclampsia.

82 Which of the following cervical spine vertebrae is most commonly fractured from falls in the elderly?

- (A) C1
- (B) C2
- (C) C3
- (D) C4
- (E) C7

83 Which of the following cardiac findings is expected in hypothermic patients?

- (A) QT interval prolongation
- (B) Sinus bradycardia
- (C) Atrial fibrillation
- (D) J waves
- (E) All of the above

84 The combination of ceftriaxone and azithromycin is a common dual-antibiotic regimen used in the empiric treatment of community-acquired pneumonia. For which of the following organisms is Azithromycin included?

- (A) *H. influenzae*
- (B) *S. aureus*
- (C) *Legionella pneumophila*
- (D) *Streptococcus pneumoniae*
- (E) *Moraxella catarrhalis*

85 A 27-year-old man is brought to the ED after being stabbed in the neck with a knife and robbed. Upon examination, you note a 3-cm wound to zone II of the neck with an intact platysma. Which of the following is the next best step in management?

- (A) Local wound care, reassurance, and discharge
- (B) Admission for 23 hours of observation
- (C) Soft tissue x-ray of the neck
- (D) Carotid angiography
- (E) CT of the neck

86 The most common cause of massive lower gastrointestinal bleeding (LGIB) is

- (A) Angiodysplasia.
- (B) Diverticulosis.

- (C) Ischemic colitis.
- (D) Colon cancer.
- (E) Inflammatory bowel disease.

87 Which of the following is used to prevent cerebral vasospasm after traumatic subarachnoid hemorrhage (SAH)?

- (A) Labetalol
- (B) Lorazepam
- (C) Isoproterenol
- (D) Verapamil
- (E) Nicardipine

88 A 23-year-old man presents with shoulder pain after falling on his left shoulder. Physical examination demonstrates tenderness in his lateral clavicle. He is able to touch his opposite shoulder with his left hand. There are no neurovascular deficits. His shoulder is shown in Figure 2-7. Which of the following is the most likely diagnosis?

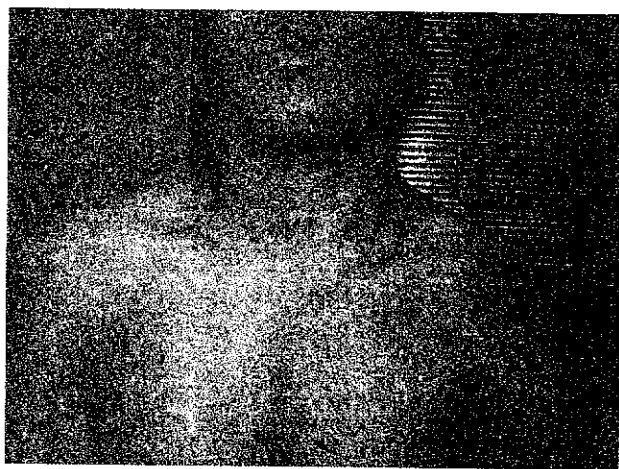


Figure 2-7.

- (A) Anterior shoulder dislocation
- (B) Inferior shoulder dislocation
- (C) Posterior shoulder dislocation
- (D) Acromioclavicular separation
- (E) Sternoclavicular dislocation

89 The most common associated finding in pharyngitis caused by adenovirus is which of the following?

- (A) Pneumonia
- (B) Encephalitis
- (C) Peritonsillar abscess (PTA)
- (D) Scarletiform rash
- (E) Conjunctivitis

90 A 14-year-old boy presents with rash all over his chest and back, as shown in Figure 2-8. His mother reports that he had "strep throat" a few days ago and she gave the patient some leftover antibiotics that she had been prescribed. Which of the following is the most likely antibiotic given?

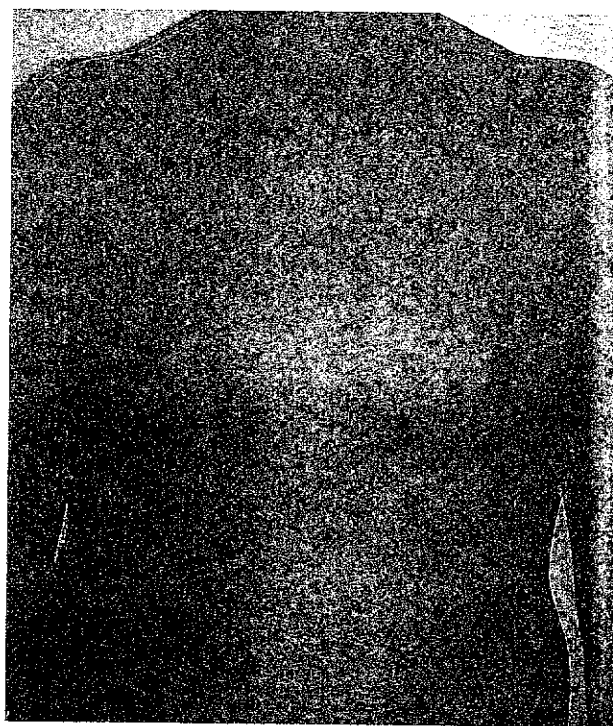


Figure 2-8.

- (A) Ciprofloxacin
- (B) Doxycycline
- (C) Amoxicillin
- (D) Azithromycin
- (E) Clindamycin

91 A 22-year-old woman presents with a 3-day history of a severe sore throat and painful swallowing. While obtaining her history, you note that she has a muffled voice, but no respiratory distress. On examination you find "two-finger" trismus, an erythematous pharynx, swelling of the left anterior pillar, and uvular deviation to her right. You diagnose a peritonsillar abscess (PTA). Which of the following is true?

- (A) *Fusobacterium* species are the most commonly isolated organisms.
- (B) This patient requires urgent tonsillectomy.
- (C) Incision and drainage is best accomplished with the patient supine.

- (D) Most of these infections are polymicrobial.
- (E) Absence of pus upon aspiration rules out the presence of an abscess.

92 A 27-year-old man is brought to the ED after an accident he had while riding an all-terrain vehicle (ATV). He was riding in an open field with a helmet and body armor when he was struck in the neck with a wire fence that knocked him off the bike and knocked him out. He now complains of a mild headache and neck and back soreness but is otherwise without complaints. His examination reveals left-sided ptosis and anisocoria with a smaller left pupil. Which of the following is most likely to reveal significant injury?

- (A) CT head without contrast
- (B) Carotid angiography
- (C) Laryngoscopy
- (D) Cervical spine series
- (E) Chest x-ray

93 A 55-year-old woman with a history of rheumatoid arthritis presents with progressive swelling and pain in her knee for 6 days. She denies trauma to the area or fever. She is on prednisone for her rheumatoid arthritis and states that her standard flares involve her ankles and fingers. Vital signs are 99.0°F, 100, 20, 132/65, 98% RA. Physical examination reveals a moderate-sized knee effusion with warmth and tenderness and extreme pain on range of motion of the joint. Which of the following is the most appropriate next step in management?

- (A) Joint aspiration
- (B) MRI of the knee
- (C) Colchicine PO
- (D) Stress-dose steroids
- (E) Indomethacin PO

94 Which of the following is the most characteristic finding on funduscopic examination for central retinal artery occlusion?

- (A) Pale gray retina with cherry red fovea
- (B) Cloudy cornea with mid-dilated pupil
- (C) Disc edema with tortuous veins
- (D) Reddish haze with black reflex
- (E) Grayish-green subretinal membrane

95 Regarding victims of motor vehicle crashes, which of the following is true?

- (A) Hypotension due to hemorrhagic shock occurs earlier in adults than in children.
- (B) Hypothermia during resuscitation occurs earlier in adults than in children.

- (C) Serious head injury is more common in adults than in children.
- (D) Renal injury is more common in adults than in children.
- (E) Liver injury is more common in adults than in children.

96 Which of the following is the most common symptom of mitral valve prolapse (MVP)?

- (A) Dyspnea
- (B) Palpitations
- (C) Peripheral edema
- (D) Lightheadedness
- (E) Orthopnea

97 A 36-year-old man was bitten on the hand by a reddish-brown snake while he was cleaning debris from his backyard. He did not catch a good glimpse of its head but thinks it had a greenish-yellow tail and he knows copperheads have been seen in the area. In the ED, he has two fang marks on the dorsum of his hand associated with local pain and mild swelling of the area extending to his wrist. The grade of his envenomation is

- (A) Grade 0 (no envenomation).
- (B) Grade 1 (mild).
- (C) Grade 2 (moderate).
- (D) Grade 3 or 4 (severe).
- (E) Copperheads are not known to be venomous in the United States.

98 A 23-year-old man is bitten on his forearm by a raccoon. Which of the following is the most appropriate anatomical region to administer human rabies immune globulin (HRIG)?

- (A) Deltoid
- (B) Gluteus maximus
- (C) At the wound site
- (D) Contralateral forearm
- (E) Corpora cavernosum

99 A 52-year-old man with a long-standing history of alcohol abuse presents with a chief complaint of vomiting blood. He was last seen by a doctor 8 months ago because of abdominal swelling and he was told he had "a liver problem." Which of the following is most likely to be useful in this patient?

- (A) Octreotide
- (B) Famotidine
- (C) Pantoprazole
- (D) Vasopressin
- (E) Propranolol

100 An 8-year-old girl presents with rash on her trunk, as shown in Figure 2-9. Which of the following is the most likely etiologic agent?

- (A) Herpes simplex virus (HSV)
- (B) Varicella-zoster virus (VZV)
- (C) Human immunodeficiency virus (HIV)
- (D) Epstein-Barr virus (EBV)
- (E) Parvovirus

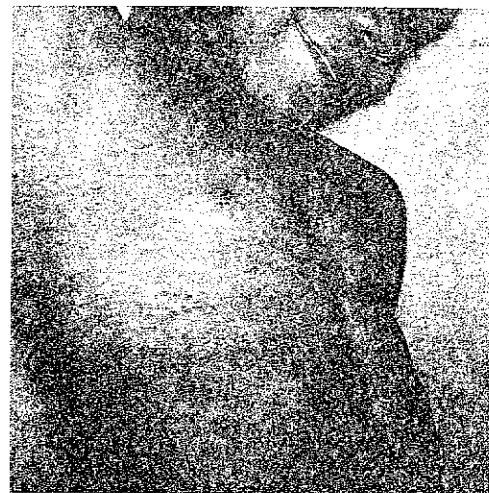


Figure 2-9.

Answers and Explanations

- 1 Answer C. Aspirin (acetyl-salicylic acid) causes a mixed acid-base disorder, with a metabolic acidosis (because of its uncoupling of oxidative phosphorylation) and respiratory alkalosis (because of its stimulation of medullary respiratory centers causing hyperventilation). The net effect on pH varies, but generally results in acidosis in children and alkalosis in adults.
- 2 Answer D. Emboli in the superior mesenteric artery (SMA) account for 50% of the cases of acute mesenteric ischemia. Emboli usually originate in the left atrium or ventricle. Most emboli lodge just distal to a major branch point, and >50% of SMA emboli are located just distal to the origin of the middle colic artery. Thrombosis of the SMA and mesenteric vein thrombosis each account for approximately 15% of cases.
- 3 Answer C. Both viral and group A streptococcal pharyngitis usually cause odynophagia and tonsillar enlargement. The absence of cough and presence of tender anterior cervical lymphadenopathy are much more common with bacterial pharyngitis. Upper respiratory symptoms and conjunctivitis in conjunction with pharyngitis and fever are almost always viral, usually due to adenovirus. The sensitivity of older rapid antigen testing for streptococcal pharyngitis is reported to be approximately 80%, compared with 90% to 95% for throat culture. Newer rapid antigen tests are reported to have comparable sensitivities to throat culture, potentially eliminating delays in care.
- 4 Answer D. Posterior shoulder dislocations occur much less commonly than anterior dislocations. Mechanisms include seizure (due to stronger internal rotator muscles compared with external rotator muscles) and fall on outstretched hand. Patients with posterior shoulder dislocation are almost never able to abduct or externally rotate their affected arms. Neurovascular injury is much less common than with anterior dislocations due to the anterior position of the neurovascular structures. Posterior shoulder dislocation is often confused with adhesive capsulitis and may simply present as stiffness and limited range of motion rather than frank pain. Recurrent injury does occur, but less commonly than in anterior shoulder dislocations. Management is with early reduction and orthopedic consultation.
- 5 Answer A. Patients with CHF die most commonly due to hemodynamic decline, followed by dysrhythmia. Mortality from fluid overload has been reduced by β -blockers and ACE inhibitors and short-term mortality from dysrhythmias has been reduced by automated internal cardiac defibrillators (AICDs). Choices B, C, D, and E are all important, but are less common causes of death in patients with CHF.
- 6 Answer D. For a given voltage, AC is thought to be three times more dangerous than DC. This is due to the fact that AC current causes repetitive muscle contraction or tetany once the "let-go current" is exceeded. This results in prolonged exposure and more severe injury. High-voltage electrical injuries should be treated like crush injuries, because there is often a large amount of tissue damage underneath normal appearing skin. It is impossible to predict the degree of underlying damage from the extent of cutaneous burns. Fewer than 10% of patients experiencing low-voltage electrical injury develop a cardiac dysrhythmia. In those patients who do suffer cardiac arrest due to an arrhythmia, ventricular fibrillation is most common. Triage priorities are different in cases of high-voltage electrical injury or lightning strikes. Patients with obvious signs of life tend to do well and can afford a small delay in definitive care. Furthermore, due to the possibility of a good outcome with cardiopulmonary resuscitation (CPR), patients without signs of life should receive immediate care.
- 7 Answer C. Patients with inferolateral knee pain and tenderness after trauma are at significant risk for tibial plateau fractures, which are often not visible on plain knee radiographs. Unlike simple knee sprains, management of tibial plateau fractures involves no weight bearing for several weeks. Diagnosis should therefore be pursued with advanced imaging techniques, such as CT or MRI. Discharging a patient with potential for tibial plateau fracture with any weight bearing will result in improper healing and increased morbidity. Observation of knee injuries is not required except in cases of suspected knee dislocation. Urgent arthroscopy is almost never indicated acutely in cases of knee trauma.
- 8 Answer D. Otitis media is the number one reason for antibiotic prescriptions in the United States, despite the fact that more than 75% of cases will

resolve spontaneously without treatment. The 2004 American Academy of Pediatrics (AAP) and American Academy of Family Physicians (AAFP) joint guidelines recommend treatment with antibiotics for patients younger than 2 years old, and consider an observation period for patients older than 2 years old an appropriate management strategy, if the patient does not have a high fever and is not systemically ill. A 3-day course of intramuscular ceftriaxone is as effective as a 10-day course of amoxicillin. High-dose amoxicillin is recommended for patients younger than 2 years of age, in day care, or with recent exposure to antibiotics. Auralgan, a mixture of benzocaine and antipyrine, is a local anesthetic that may provide some direct analgesia, but should not be used in patients with tympanic membrane perforation.

99 Answer C. Noninvasive positive pressure ventilation (NIPPV) has revolutionized the treatment of COPD, cardiogenic pulmonary edema, as well as neuromuscular disease (e.g., myasthenia). Contraindications for NIPPV are noncompliant patients (which is the most common for treatment failure), midfacial trauma (preventing an appropriate fit for the mask), excessive secretions or retention of secretions, as well as a decreased sensorium with absent cough and pharyngeal reflexes. Recent gastric surgery (because of possible gastric distension) and vasopressor-dependent hypotension are relative contraindications as well. Hypertension does not affect, nor is it affected by NIPPV.

100 Answer B. The patient has evidence of stress fracture of the tibia, which is almost always due to overuse and occurs more commonly in women than men. The tibia is the most common bone involved. Radiographs are usually normal acutely and only positive 50% of the time subacutely. Bone scan has much higher sensitivity than radiographs, but a much lower specificity. Advanced imaging with CT scan and MRI is not indicated in the vast majority of cases, as management is rarely affected. Standard treatment with rest, ice, and nonsteroidal anti-inflammatory drugs (NSAIDs) results in resolution of almost all cases. Cast immobilization or surgery is used only for refractory cases and severe symptoms.

101 Answer C. Postintubation hypotension is a common problem in asthmatics, occurring in as many as 20% of intubated patients. The presence of severe airflow obstruction can cause air trapping even in the setting of normal minute ventilation. Air trapping causes elevated intrathoracic pressures, which decreases venous return and subsequently cardiac output and BP. These problems are exacerbated in patients who are relatively hypovolemic, and for this

reason, some experts recommend bolusing asthmatics with one liter of crystalloid before intubation. In the setting of the "crashing" patient, excessive or overzealous "bagging" is often mistakenly applied in an attempt to resuscitate the patient. This creates the perfect setup for postintubation hypotension by insufflating the chest with a large volume of air. Because connecting the ventilator was the trigger for this patient's hypotension, the most prudent step is to immediately disconnect the ventilator and allow the patient to exhale for 30 seconds (the apnea test). Immediate recovery suggests auto-PEEP and lung hyperinflation \pm hypovolemia and it responds to aggressive IV fluids (frequently >1 L is required). Persistent hypotension suggests tension pneumothorax and should prompt an immediate needle thoracostomy once the pneumothorax is located. Of course, pneumothorax should be suspected anytime there is a sudden clinical deterioration. Needle thoracostomy may be required given severe hypotension \pm tracheal deviation.

102 Answer D. This patient is manifesting signs of hepatic encephalopathy (HE). HE is graded on a 4-stage scale, and its symptoms range from subtle personality changes and sleep disturbances to confusion, disorientation, stupor, and coma. Although elevated ammonia levels may support the diagnosis, they do not always correlate with the severity of illness and normal levels do not exclude the diagnosis. Roughly 25% of patients will have non-nitrogenous causes of encephalopathy. However, azotemia is the most common precipitant and GI bleeding is a very common cause of azotemia and may frequently trigger or exacerbate HE. The treatment of choice is ammonia-lowering therapy with lactulose or neomycin in the case of azotemia-induced causes. Otherwise, treatment should be directed at the underlying precipitant.

103 Answer D. Patients with new-onset psychosis must be evaluated in the ED for treatable medical illness before being assigned a psychiatric diagnosis. Signs of a medical cause of the psychosis include acute onset, older patient, visual hallucinations, disorientation, and impaired consciousness. Abnormal physical examination findings, such as abnormal vital signs, aphasia, ataxia, and cranial nerve abnormalities usually indicate a medical cause. Many pharmacologic agents can also cause psychosis, including corticosteroids, antihistamines, antidepressants, and sedative hypnotic. True psychiatric disease is suggested by a young adult patient, auditory hallucinations, gradual progression, flat affect, and intact orientation and consciousness.

- 14 Answer C. The modified diagnostic criteria for migraine defines migraine headache as a headache lasting 4 to 72 hours, which includes at least two of the following four symptoms:

- Unilateral pain
- Throbbing
- Moderate to severe intensity
- Pain aggravated by movement

And one of the following two symptoms:

- Nausea or vomiting
- Photophobia or phonophobia

Unfortunately, many of these symptoms are similar to those experienced by patients with cluster headaches. However, the pain in cluster headaches is typically described as "boring" or "tearing," despite being of severe intensity. Furthermore, pain associated with cluster headaches is almost always retro-orbital and in the temporal region (due to involvement of the V1 branch of the trigeminal nerve). Cluster headaches are not typically associated with nausea or vomiting, nor photophobia or phonophobia. The key difference between these two headache syndromes is the cyclic nature of cluster headache exacerbations and the stereotypical presentation of patients with cluster headaches. Sumatriptan is useful for the acute treatment of patients with either headache syndrome.

- 15 Answer E. Abruptio placentae is the most common cause of third trimester bleeding and has a correlation with increasing maternal age and cigarette smoking. However, preeclampsia is most commonly associated with placental abruption, especially in severe cases. Interestingly, the incidence of abruption peaks between 24 and 26 weeks and then steadily declines as patients progress to term. Patients most commonly experience vaginal bleeding and abdominal pain although patients may present with only one or neither of these symptoms. Abruptio often results in frequent, low-amplitude uterine contractions resulting in a uterus that is firm and frequently tender upon palpation. Disseminated intravascular coagulation is a dreaded complication. Ultrasonography must be performed in all patients with second- or third-trimester vaginal bleeding. However, ultrasonography is poorly sensitive for placental abruption, missing approximately 50% of cases. In contrast, ultrasonography is a very good modality for detecting placenta previa, the other major cause of second- and third-trimester vaginal bleeding. If placenta previa is present, abruption is less likely.

- 16 Answer B. Naloxone is a pure opioid antagonist with an extremely rapid onset of action, duration of

1 to 2 hours, and the ability to be delivered by a variety of routes (IM, IV, subcutaneous [SC], endotracheal [ET]). The duration is of prime importance, as patients with opiate overdose who are given a one-time naloxone dose in the ambulance often become acutely intoxicated again once the naloxone wears off. All opiates have longer durations of action than naloxone, even heroin, which can last as long as 2 to 3 hours if used by the SC route. For this reason, all patients with severe opiate overdose should be monitored carefully in the ED at least as long as the expected peak effect of the particular opiate.

- 17 Answer A. Hypokalemia is more common and generally better tolerated than hyperkalemia. Diuretic therapy is the most common cause. Hypokalemia primarily affects the cardiac (arrhythmias), musculoskeletal (weakness, rhabdomyolysis), GI (ileus), and renal (nephrogenic diabetes insipidus, metabolic alkalosis) systems. Neurologic manifestations are not common. Cardiac dysrhythmias are the most serious complication although patients without heart disease rarely have any complications. In contrast, patients with acute or recent MI may develop ventricular fibrillation in the setting of even mild hypokalemia (five times increased risk if $[K^+] < 3.9$ mEq per L. Therefore, recent recommendations are to maintain serum $[K^+] > 4.5$ mEq per L in such patients. However, the number or degree of EKG changes does not correlate with the severity of hypokalemia. Neither vomiting nor nasogastric suctioning causes significant potassium loss. Potassium is the most prominent intracellular cation.

- 18 Answer A. Pain with extraocular movements, decrease in visual acuity, proptosis, and ophthalmoplegia more commonly occur in orbital cellulitis than in periorbital cellulitis. The large majority of cases of orbital cellulitis result from direct spread of adjacent infections such as ethmoid sinusitis, whereas periorbital cellulitis typically results from hematogenous spread. *Aspergillus* species cause a chronic orbital cellulitis lasting from weeks to months. Orbital cellulitis may cause blindness and extension inside the cranium to involve the dural sinuses and meninges. Periorbital cellulitis cannot progress to orbital cellulitis in the absence of trauma due to a thick fibrous layer separating the orbit from more superficial tissues.

- 19 Answer C. Isopropanol is the second most commonly ingested alcohol after ethanol. Choices A, B, and D are less commonly ingested. Choice E, acetone, is not an alcohol because it lacks a hydroxyl group.

- 20 Answer E. This patient has tinea capitis, which is a fungal infection of the scalp usually caused

by *Trichophyton tonsurans*. Tinea capitis should be suspected in all prepubescent children with hair loss, particularly if the hair loss is focal and incomplete or associated with scale and lymphadenopathy. There may be scattered hairs that are broken near the base within a generalized area of alopecia, resulting in the appearance of black dots on the scalp surface ("black dot" ringworm). Although topical agents such as selenium sulfide and topical ketoconazole may reduce infectivity, they are insufficient to provide effective monotherapy. In all cases, oral therapy with griseofulvin (either micronized or ultramicrosized) is required. Transmission from person to person is common, and *Trichophyton* remains infectious in combs and hairbrushes for long periods. (Figure reprinted with permission from Fleisher GR, Baskin MN. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003:95.)

21 Answer D. Pilonidal cyst and subsequent abscess formation is thought to occur as a result of obstruction of a pilonidal sinus. Pilonidal sinuses are thought to be present from birth although they are not clinically evident until late adolescence or the early adult years. It is not clear why obstruction occurs, but it is much more common in hirsute men than any other group of patients. Poor hygiene and repetitive low-level trauma (such as in jeep drivers in World War II) have also been implicated. Treatment in the ED a longitudinal incision off of the sacral midline to prevent reaccumulation of hair and other debris. Despite this, recurrence is common. All patients with pilonidal abscesses should be referred to a surgeon for further management.

22 Answer B. Otic symptoms are the earliest observed in salicylate toxicity. The Done nomogram is not predictive of serious pathology in salicylate toxicity and is not used clinically (unlike the Rumack-Matthew nomogram for acetaminophen toxicity). Metabolic acidosis due to uncoupling of oxidative phosphorylation is much more likely to be observed than metabolic alkalosis. Despite the clear role of chronic aspirin and NSAID use in GI bleeding, acute toxicity causes far less common serious bleeding through the GI tract. Hypokalemia is far more common than hyperkalemia with salicylate toxicity, due to a variety of renal and extrarenal mechanisms. Therapy with bicarbonate may further exacerbate this potassium loss.

23 Answer D. Like hypermagnesemia, hyperphosphatemia is rare in patients without renal insufficiency. Its manifestations are related to its effects on calcium and its rate of rise. A rapid rise in phosphate levels results in calcium chelation and subsequent

hypocalcemia, which may present as tetany. When the calcium-phosphate product is >70 , precipitation of calcium phosphate can occur in a variety of tissues (e.g., renal stones). Apart from renal failure, any process which results in rapid, extensive cell damage may cause phosphate to be released into the extracellular space in large amounts. Examples include rhabdomyolysis, tumor lysis syndrome, and hemolysis.

24 Answer E. Although it may be counterintuitive, most patients develop primary spontaneous pneumothorax while at rest. Traditionally, expiratory chest x-rays were thought to aid in the diagnosis of pneumothorax. Because the relative size of the chest cavity is thought to decrease during expiration, and since the size of the pneumothorax is theoretically constant, the pneumothorax should occupy a greater fraction of the chest cavity and therefore be easier to detect upon expiration. Clinically, however, expiratory films have not demonstrated much utility. Pneumomediastinum is a less common but generally benign finding, and is frequently self-limited. It is usually due to persistent elevations in intrathoracic pressure such as that caused by repetitive severe coughing, asthma exacerbations, or seizures. In contrast, secondary pneumomediastinum is a morbid diagnosis as a result of significant underlying disease such as Boerhaave's syndrome. Hamman's sign or crunch is a physical examination finding in the setting of pneumomediastinum. It describes the crunch-like sound heard upon cardiac auscultation as the heart expands against the mediastinal air. The most frequent physical examination finding in pneumomediastinum is SQ emphysema, frequently in the neck. Male smokers have more than a 20-fold increased risk of developing a spontaneous pneumothorax, whereas woman smokers have a more than 10-fold increased risk. Other risk factors include tall height and cold weather (there is an increased incidence in the fall and winter).

25 Answer B. Central cord syndrome is the most common incomplete spinal cord syndrome. Unlike anterior cord syndrome, central cord syndrome typically results from forced hyperextension injuries in arthritic middle-aged and older adults. The posterior ligamentum flavum is thought to buckle and compress the cord against anterior osteophytes, resulting in a contusion to the central aspects of the cord. Owing to the topography of the spinal cord, extension injuries occurring at the level of the cervical spine result primarily in flaccid paralysis of the upper limbs; to a lesser extent, spastic paralysis or paresis of the lower extremities occurs in the setting of large cord lesions. Furthermore, distal muscles

are affected more than proximal muscles. There is variable sensory dysfunction, but because most sensory neurons are located peripherally, sensory findings tend to be less prevalent. Finally, there should be preserved perianal sensation, voluntary rectal motor function, big toe flexor activity, and preservation of the bulbocavernosus reflex. Together, the presence of these functions is referred to as *sacral sparing*.

- 26 Answer C. Acute radiation enteritis occurs in 20% to 70% of patients (varies widely depending on technique, dose, and patient factors) and is more common than chronic radiation enteritis, which occurs in as many as 15% of patients. Ultimately, many patients die from their malignant process before the development of chronic radiation enteritis, so the true incidence is unknown. The acute form typically occurs 3 weeks after the onset of radiation and presents with crampy abdominal pain, tenesmus, and bleeding. It is rarely life threatening. The chronic form ordinarily occurs within 2 years of therapy but it can occur at any time after therapy and occurs later than 2 years in 10% of patients. In acute radiation enteritis, no diagnostic testing is typically required and management is supportive. In chronic radiation enteritis, CT may only be useful to exclude the recurrence of malignancy or other problems, but has no findings specific for radiation enteritis.
- 27 Answer D. Patient or toxin odor may provide important clues to the toxic agent. The smell of garlic is suggested by organophosphates, arsenic, or selenium. Cyanide smells like almonds, zinc has a fishy odor, and toluene smells like glue. Hydrogen sulfide has the odor of rotten eggs.
- 28 Answer E. Gamekeeper's thumb is an avulsion injury of the ulnar collateral ligament (UCL) at the thumb-MCP joint. It most commonly occurs during a skiing accident in which a patient's thumb is trapped in the loop of the pole, resulting in forced abduction and extension of the thumb. An avulsion fracture may also occur at the site of the UCL insertion. Examination will reveal difficulty with pinching and grasping, tenderness and swelling along the ulnar aspect of the base of the thumb, as well as laxity of the MCP joint upon stress testing. Patients should be placed in a thumb spica splint and referred to a hand surgeon for further evaluation. A Stener lesion occurs when the adductor pollicis tendon inserts itself between the two ends of the ruptured UCL. They may occur in up to 29% of patients with UCL rupture and will prevent healing of the UCL. A Stener lesion should be suspected in any patient with extreme

laxity of the thumb MCP joint, although MRI may be required for diagnosis. Owing to inadequate UCL healing in the setting of a Stener lesion, all such patients require surgery.

- 29 Answer B. Hemorrhage occurs in approximately 15% of patients with PUD, although it is twice as likely in patients with duodenal ulcers as in patients with gastric ulcers. Roughly half the number of patients with UGIB due to PUD present with melena and hematemesis. Isolated melena occurs in only 20% of patients and isolated hematemesis occurs in only 30% of patients. The mortality rate has remained relatively unchanged over the last 30 years, and is between 6% and 10%. Perforation is accompanied by hemorrhage in roughly 10% of cases. Therefore, these entities are not usually confused upon evaluation.
- 30 Answer D. Severe poison ivy requires systemic corticosteroids. Commercially available "dose packs" should be avoided because they provide an inadequate amount of medication. In addition, a prolonged course of prednisone treatment is generally required due to the high chance of rebound dermatitis if prednisone is discontinued abruptly. Therefore, a 14- to 21-day taper generally works best.
- 31 Answer E. With a positive India ink stain of the cerebrospinal fluid (CSF), the patient has fungal meningitis, most likely due to *Cryptococcus neoformans*, an opportunistic infection common patients with AIDS. Patients usually present with typical symptoms of aseptic meningitis. The CSF WBC and protein are usually only slightly elevated. India ink staining has approximately 80% sensitivity, so CSF should also be sent for cryptococcal antigen, which has close to 100% sensitivity and specificity. Treatment for cryptococcal meningitis is with amphotericin B plus flucytosine, which is superior to itraconazole monotherapy. Fluconazole monotherapy may be used in very mild cases. Ceftriaxone and vancomycin are used for therapy of bacterial meningitis. Acyclovir is used for herpes simplex encephalitis (HSE), which is suggested by altered mental status and elevated CSF RBC count.
- 32 Answer C. Iron-deficiency anemia is the most common cause of all anemias in women of child-bearing age, likely due to menstrual blood loss. Iron-deficiency anemia is the number one cause of microcytic anemia and is characterized by a rapid response to oral iron therapy. Both α - and β -thalassemia cause microcytic anemia, but are far less common than iron-deficiency anemia. Microcytosis is more severe in patients with thalassemia than

with iron-deficiency anemia. Definitive diagnosis is made by hemoglobin electrophoresis. Sideroblastic anemia is usually found in elderly patients, alcoholics, and in those with lead poisoning. Folate deficiency, although common, causes macrocytic anemia.

Answer A. The patient's head CT demonstrates an acute cerebellar hemorrhage. Surgical intervention has been the mainstay of management of cerebellar hemorrhage. However, in awake patients with relatively small infarcts (<3 cm), patients may be candidates for observation in an intensive care setting. All patients with cerebellar hemorrhage, however, may deteriorate rapidly due to hydrocephalus or progressive brainstem compression. Owing to the local mass effect, the fourth ventricle may become compressed resulting in an obstructive hydrocephalus. This requires emergent ventricular drainage. Owing to the possibility of rapid deterioration, all patients with cerebellar infarction should be admitted to an intensive care setting. Corticosteroids and anticonvulsants have no role in the management of cerebellar hemorrhage. Corticosteroids help to reduce the vasogenic edema associated with tumors, but not the cytotoxic edema associated with infarction. Prophylactic anticonvulsants have not proved to be useful, and because seizures are initiated in the cortex, cerebellar lesions should not trigger epileptic events. Herniation may occur in these patients, but results in upward transtentorial herniation, not uncal herniation. Finally, the Cushing response may occur, but results in very high BPs, with systolic pressures in the neighborhood of 200 mm Hg. This degree of hypertension usually portends a bad outcome. (Figure courtesy of Mark Silverberg, MD. Reprinted in Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:46, with permission.)

Answer C. Pregnant women develop appendicitis at the same rate as nonpregnant women. Owing to nearby gynecologic structures, women with appendicitis are more frequently misdiagnosed. As many as 33% of women with appendicitis are initially misdiagnosed, and as many as 45% of women with symptoms of appendicitis are found to have a normal appendix during surgery. Although cervical motion tenderness (CMT) is more common in gynecologic diseases, as many as one fourth of women with appendicitis have CMT upon physical examination. Even in the third trimester, most pregnant women still have pain in the right lower quadrant. In pregnant women, appendicitis occurs slightly more often in the second trimester, although the reasons for this are not known. Fetal abortion complicates perforated maternal appendicitis in 20% of cases.

Answer E. All Rh-negative pregnant patients with first-trimester vaginal bleeding should be given RhoGAM. The dose in the first trimester is 50 μ g, whereas the dose after the first trimester is 300 μ g. RhoGAM has not been shown to cause fetal harm. The classic teaching is that 50% of patients diagnosed with a threatened abortion progress to spontaneous miscarriage. However, once a fetal heartbeat is identified on ultrasonograph, only 15% of such women will progress to spontaneous miscarriage whereas the remainder will carry the pregnancy normally to term. Patients with threatened abortion should be advised to carry out their normal activities although patients are often advised to avoid tampons, intercourse, and douching to prevent infection. Patients frequently confuse blood clots with tissue and even in the presence of laboratory confirmation of products of conception, a diagnosis of complete abortion is ill-advised. Only if a complete gestational sac or fetus is present should a diagnosis of complete abortion be considered. Otherwise, an ultrasound should be performed to determine if retained products of conception are present. Finally, approximately 80% of patients with first trimester spontaneous abortion will complete the abortion without intervention. Classic teaching is that all patients diagnosed with an embryonic pregnancy (or blighted ovum), intrauterine fetal demise, missed abortion, or incomplete abortion require surgical evacuation. However, current research demonstrates that the volume of intrauterine contents is the best predictor of the need for surgical evacuation and most women do not require intervention.

Answer E. Patellar fractures usually occur due to direct blows to the patella from falls or motor vehicle collisions. They may be invisible on standard AP and lateral views of the knee, and patellar sunrise views may be necessary for diagnosis. Transverse patellar fractures are the most common type, but longitudinal fractures also occur and are easily seen on sunrise view.

Answer B. Elderly, diabetic and female patients have atypical anginal symptoms. The extreme elderly (>85 years) experience shortness of breath as the most common symptom during an MI. Nausea, typical chest pain, syncope, and fatigue may also be present. The emergency physician (EP) can never clinically rule out the diagnosis of acute coronary syndrome in elderly patients just because they lack frank chest pain. Choices D and E occur more frequently in dehydration and infection than in MI.

- 38 Answer B. The peak expiratory flow rate (PEFR, in liters per second) and the FEV₁ (in liters) are both valuable adjuncts in assessing the severity of airflow obstruction. Because of its portability and ease of application, however, PEFR is much more easily measured and is more useful for EPs. Although the absolute value of the PEFR may be useful, it is most useful by comparing any value to a patient's typical best (as a percentage). A patient who generates a PEFR <50% of his or her typical best has severe airflow obstruction. The utilization of arterial blood gas (ABG) determination widely varies in clinical practice. However, because of the accuracy of pulse oximetry monitoring, only patients whose POx value is <90% despite oxygenation requires an ABG. Furthermore, repeat ABGs are generally not needed to determine whether a patient is improving or deteriorating. Chest x-rays are not generally useful in patients with asthma exacerbations. They do not reflect the severity of the exacerbation. They are generally useful only for those patients in whom pneumonia, or a complication (e.g., pneumothorax) is suspected, or in those patients who remain refractory despite optimal therapy. Neither continuous cardiac monitoring, nor routine EKGs are useful in routine asthma exacerbations. Both of these may be useful, however, in older patients with coexisting cardiac disease. Most patients have pulse rates between 90 and 120, and only 15% exceed this value.
- 39 Answer C. NAC promotes the metabolism of acetaminophen into a nontoxic compound by sulfation through replenishment of glutathione. Prevention of hepatic injury is complete when the first dose of NAC is given within 8 hours of acute ingestion. Beneficial effects still occur as far out as 48 hours after ingestion, but efficacy in preventing hepatic injury decreases progressively starting at the 8-hour mark.
- 40 Answer D. Patients with ischemic stroke should not have their BP reduced unless they are either candidates for tPA, have concomitant aortic dissection, MI or renal failure, or their pressure is above 220/120 mm Hg. In fact, hypertension is probably neuroprotective in patients with ischemic stroke by ensuring that cerebral perfusion pressure is maintained. In contrast, patients with hemorrhagic stroke should have their BP reduced to a target SBP of 140 to 160 mm Hg (or the patient's prestroke level if it is higher). Lowering the BP in such patients may reduce the stimulus for bleeding and prevent hematoma expansion. Because prognosis in patients with intracerebral hemorrhage is tightly linked to

hematoma volume, strict BP control may have a dramatic positive effect in such patients.

- 41 Answer C. Hypertrophic cardiomyopathy is the most common cause of atraumatic sudden death in young athletes. Choices A, B, and D are far less common in this age-group. Choice E can occur in tall, thin athletes and although death may result from tension physiology, it is almost never sudden or without preceding symptoms.
- 42 Answer A. This patient's pleocytosis with a lymphocytic predominance in concert with a normal glucose and elevated protein level supports the diagnosis of a viral etiology. Herpes simplex encephalitis (HSE) is the most common cause of severe encephalitis in the United States despite the fact that arboviruses such as West Nile virus continue to get significant media coverage. The most common symptoms of HSE are fever, altered mental status, decreased consciousness, and focal neurologic findings. Focal seizures may also occur (temporal lobe seizures). Because acyclovir is extremely well tolerated and is very effective for treating HSE, it should be started as soon as the diagnosis of HSE is suspected. Dexamethasone is used as an adjunctive treatment in bacterial meningitis and should be given just before or with the first dose of antibiotics. Amphotericin B is an antifungal agent.
- 43 Answer A. *S. aureus* remains the most common cause of septic arthritis, accounting for 37% to 56% of infections. It causes 80% of the infections in patients with underlying diabetes or rheumatoid arthritis. Group A β -hemolytic streptococci are the second most common cause of septic arthritis. The remainder are caused by other streptococci, gram-negative organisms, and gonococcus. *N. gonorrhoeae* accounts for only 20% of monoarticular septic arthritis, although it accounts for a larger proportion of polyarticular septic arthritis, which is its usual presentation. Gram-negative organisms are the most common cause of septic arthritis in newborns and in children younger than 5 years old, although vaccination programs have nearly eliminated *H. influenzae* as a cause.
- 44 Answer E. Although the patient has clear evidence of brain or spinal injury from blunt trauma, no radiographic evaluation can take place until the patient is cooperative. In cases where patients put themselves or caregivers at risk of physical harm, the trauma team leader's first responsibility is to control the patient's behavior to prevent this occurrence. Sedating the patient with lorazepam or haloperidol

is the ideal first-line management, but if this is not an option, sedation and paralysis with rapid-sequence intubation should be performed. This will allow the trauma evaluation to take place expediently and reduce the risk of harm to the patient and caregivers. Once the patient's combative behavior is controlled, CT of the brain and spinal cord, along with the rest of the secondary survey may be initiated.

45 Answer C. The patient has evidence of bacterial vaginosis, a bacterial overgrowth process due to polymicrobial infection with *Gardnerella*, *Mycoplasma*, and anaerobes. Clue cells refer to vaginal squamous epithelial cells lined with bacteria. The sniff test (fishy odor of the discharge with addition of potassium hydroxide) may also be positive in bacterial vaginosis. Treatment is with an antibiotic to cover anaerobic bacteria—therapy must be instituted for at least 1 week, unlike in cases of *Trichomonas* vaginitis, where one-time therapy with a 2 g dose of metronidazole is adequate. First-line therapy for bacterial vaginosis is with metronidazole 500 mg b.i.d. for 7 days, but clindamycin is an acceptable alternative. Fluconazole is used to treat candidal vaginitis. Ceftriaxone is used to treat gonorrheal infections. Azithromycin is used to treat chlamydial infections and a number of other sexually transmitted diseases.

46 Answer C. The WBC count is a relatively non-specific test that is routinely ordered in the ED. A multitude of physiologic and pathologic states can cause leukocytosis, rendering the test useless in most clinical situations. Any body stress, such as pain, exercise, or pregnancy, can increase the WBC count to 20,000 cells per mm³. An elevated WBC has little specificity for the presence of infection. The presence of 95% neutrophils indicates a neutrophilic predominance, not a "left shift." A "left shift" is said to be present when immature WBC forms such as bands, metamyelocytes, or myelocytes are detected in the circulation. The degree of leukocytosis (and even the differential) cannot accurately distinguish between viral and bacterial infection. Few clinical situations cause an extremely elevated WBC count. Although chronic myeloid leukemia is one of the common causes, other leukemias, the leukemoid reaction, *C. difficile* colitis, and disseminated candidiasis can all cause a WBC count >50,000 cells per mm³.

47 Answer D. Physostigmine is an acetylcholinesterase inhibitor that serves to antagonize the affect of anticholinergic agents. It affects both nicotinic and muscarinic receptors and crosses the blood-brain barrier. Despite its comprehensive cholinergic effects, potential toxicity may occur during rapid administration, severely limiting its clinical use. It is absolutely

contraindicated in patients with tricyclic overdose due to its potential for causing seizures and asystole. Supportive care is more beneficial than physostigmine therapy in most anticholinergic crises.

48 Answer A. Eighty to 90% of objects that have made it into the stomach will pass through the remainder of the GI tract without difficulty. However, as many as 15% to 35% of sharp or pointed objects may cause perforation if untreated. The ileocecal valve is the most common site of perforation. Objects that are in the stomach are amenable to endoscopic removal, but objects distal to this point generally cannot be retrieved. Because this child is asymptomatic, there is no indication for surgery at this point. Surgery is only indicated in cases of perforation, hemorrhage, or in cases of fistula formation or obstruction. Because this child has a relatively high risk of perforation, he cannot be discharged home. Appropriate management includes daily abdominal radiographs to follow the passage of the object. Surgical management should be individualized but may be considered if the object fails to pass for a number of days. (Figure reprinted with permission from Fleisher GR, Baskin MN. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003.)

49 Answer E. Patients with periorbital (preseptal) cellulitis may have fever, periorbital edema, and eye tenderness, but ophthalmoplegia is characteristic of orbital cellulitis. Gram-positive cocci are common causes of both conditions, but *S. aureus* is more commonly implicated in periorbital cellulitis. Orbital cellulitis is usually caused by *Streptococcus pneumoniae*, *H. influenzae*, *M. catarrhalis*, *S. pyogenes* and polymicrobial infection. Diagnosis can be definitively made by CT scan of the brain and orbits. Orbital cellulitis mandates hospital admission with IV antibiotics, whereas uncomplicated cases of periorbital cellulitis may be managed on an outpatient basis.

50 Answer C. The triad of anemia, thrombocytopenia, and renal insufficiency should prompt evaluation for either hemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP). Fever and neurologic signs and symptoms are more common in the latter, but the two are thought to be on the same spectrum of disease. The toxin-forming bacterium *E. coli* O157:H7 is responsible for most epidemic cases of HUS. Treatment is primarily supportive, aimed at preventing complications of severe anemia and thrombocytopenia. Plasmapheresis is used for cases of idiopathic HUS or TTP. *Shigella* is a less common precipitant of HUS than *E. coli*, but *Salmonella* species and rotavirus are not implicated.

Child abuse would be unlikely to cause these symptoms in an epidemic manner.

- 51 Answer C. In 2002, the Transient Ischemic Attack Working Group redefined transient ischemic attack (TIA) as "a brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting <1 hour, and without evidence of acute infarction." Positive findings such as tingling or involuntary movements are the exception in patients with a TIA. In addition, symptoms affecting multiple different body parts usually occur simultaneously. "Marching" symptoms are more common in patients with migraines or seizures. Nonfocal symptoms such as generalized weakness, dizziness, lightheadedness, and confusion are not commonly due to a TIA. Finally, the most common mimic of symptoms attributable to a TIA is hypoglycemia.
- 52 Answer D. The patient has a total (or "eight-ball") hyphema. The pupil is almost completely obscured by blood in the anterior chamber due to the ocular trauma. ED management is with ophthalmologic consultation, topical steroids (under the direction of the ophthalmologist only), head elevation, eye shielding, and tetanus booster. The eye is shielded to prevent secondary injury and further bleeding. Trendelenburg positioning and NSAIDs will likely worsen the bleed and are contraindicated. Although factor VII has important procoagulant activities, it has currently not been approved for use in patients with hyphemas. IV antibiotics are not indicated except in patients with evidence of globe rupture. (Figure from Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001, with permission.)
- 53 Answer A. Many agents have been advocated, but vinegar is the agent of choice. However, some coelenterates have species-specific treatment and most jellyfish stings require no treatment at all. However, in cases in which tentacles and nematocysts remain adherent to skin, vinegar should be liberally poured over the nematocysts before their removal. Tentacles and nematocysts should then be removed by a gloved hand. Fresh water and alcohol may induce further nematocyst discharge and should not be used. Gently rinsing the wound with seawater is advocated as part of general wound care but it does not inactivate the toxin like vinegar.
- 54 Answer E. Optic neuritis is the most common cranial manifestation of MS, and describes a syndrome of monocular eye pain, decreased color perception,

and variable visual loss primarily affecting central vision. However, sensory disturbances, diplopia (internuclear ophthalmoplegia), Lhermitte's sign (trunk and limb paresthesias evoked by neck flexion), limb weakness, clumsiness, gait ataxia, and neurogenic bladder and bowel symptoms may also be presenting signs and symptoms. Approximately 20% of patients with MS will present with optic neuritis and 50% of patients with MS will experience optic neuritis at some point in the disease course.

- 55 Answer B. Myringitis, which is inflammation of the tympanic membrane, is a rare occurrence in the setting of *Mycoplasma* infections and is not required to establish a diagnosis. Furthermore, the presence of myringitis, bullous or not, is not pathognomonic for *Mycoplasma* infection as a host of other etiologies are possible. *Mycoplasma* commonly occurs in outbreaks in closed communities such as camps, military bases, hospitals, religious groups, and facilities for the mentally ill. Neurologic complications occur in 6% to 7% of children hospitalized with *Mycoplasma* infections, and may include aseptic meningitis, encephalitis, and Guillain-Barré paralysis, among other complications. Cold agglutinins are autoantibodies directed toward RBCs which have been antigenically altered by *Mycoplasma*. Their titers do not rise to detectable levels until approximately 2 weeks after infection and they may not be present in all patients. *Mycoplasma* is not a common cause of pneumonia in the elderly.
- 56 Answer E. The patient has acute bacterial prostatitis. Fever, low back pain, and UTI symptoms are common. A warm, tender prostate is the characteristic physical examination finding. The prostate should never be massaged because of the possibility of bacteremic spread. Etiology is almost always due to gram-negative enteric bacilli, most commonly *E. coli*. Diagnosis is made by physical examination combined with urinalysis, as there is often a concomitant cystitis. Treatment is with either trimethoprim-sulfamethoxazole or a fluoroquinolone. Treatment must be continued for 1 month to assure clinical cure. Ceftriaxone and doxycycline are the drugs of choice for young men with urethritis. Azithromycin is an acceptable alternative for treating chlamydial infections. Three-day and 7-day regimens with a fluoroquinolone are used for treating uncomplicated UTI and complicated UTI, respectively, in women.
- 57 Answer C. Myoglobin has excellent sensitivity and negative predictive value for acute MI early in the course of the disease, beginning to rise within 2 hours' postinfarct, and peaking at 5 hours. The specificity of myoglobin is lower than that of troponin I, troponin T, or CK-MB, due to its release by skeletal

muscle during trauma and exercise. Myoglobin is far less useful as a test in patients who present >12 hours after onset of symptoms.

58 Answer C. Recent studies have demonstrated that serum epinephrine levels are higher and rise faster in patients given epinephrine through IM injection in the lateral thigh instead of through SQ injection. SQ administration results in variable absorption and may be delayed by the vasoconstrictive effect of epinephrine. Patients with epinephrine autoinjectors are taught to inject epinephrine into the lateral thigh musculature (vastus lateralis). Although no trials assessing *outcome* and comparing SQ and IM administration have been performed, the current recommendation is that epinephrine be delivered through the IM route in the lateral thigh.

59 Answer A. The patient has evidence of an incarcerated hernia. The presence of fullness and bowel sounds in the scrotum indicates a hernia, and tenderness with inability to easily reduce the hernia indicates incarceration. Ice packs should be applied to the area to reduce the attendant bowel edema and an attempt should be made to reduce the hernia, under procedural sedation if necessary. Operative reduction and IV antibiotics would likely be necessary if the patient presented with signs of strangulation such as fever, acidosis, and/or severe tenderness. Outpatient referral for an incarcerated hernia is not appropriate. Oral hydration may maintain euolemia, but the possibility of procedural sedation or surgery should preclude any oral intake. Incarcerated hernia is a clinical diagnosis and urinalysis will not aid diagnostic accuracy.

60 Answer D. Patients with primary adrenal insufficiency develop hyperpigmentation due to increased corticotropin (adrenocorticotropic hormone [ACTH]) secretion and its effects on melanocyte receptors. Adrenal insufficiency secondary to pituitary insufficiency precludes elevated ACTH levels, so hyperpigmentation is not seen. Hyponatremia, hyperkalemia, and hypoglycemia are common electrolyte abnormalities as a result of adrenal insufficiency (specifically mineralocorticoid insufficiency). Therefore, hypokalemia may occur as a result of replacement therapy with prednisone or hydrocortisone (but not with dexamethasone, which does not have mineralocorticoid activity). Nausea and vomiting are common GI manifestations of adrenal insufficiency.

61 Answer D. Hemodynamically unstable patients with evidence of intra-abdominal hemorrhage should be taken to the operating room (OR) for emergent laparotomy, even in the setting of a pelvic

fracture. In an unstable patient with a pelvic fracture, a positive aspirate (i.e., the aspiration of gross blood upon entering the peritoneal cavity with the lavage catheter) is suggestive of ongoing intraperitoneal hemorrhage and organ injury and is an indication for emergent laparotomy. If the aspirate is negative but the lavage is positive by cell counts, or if the aspirate and lavage are negative, pelvic angiography and stabilization is indicated. A positive diagnostic peritoneal lavage (DPL) by cell count in the setting of a pelvic fracture but a negative aspirate is usually due to retroperitoneal hemorrhage from the pelvic fracture. Therefore, measures to stabilize pelvic bleeding (angiography, external fixators) should be undertaken as soon as possible.

62 Answer D. In Western countries, CHF is the most common cause of a pleural effusion. In the setting of CHF, pleural effusions are most commonly bilateral although they may present unilaterally. Isolated right-sided pleural effusions are nearly twice as common as isolated left-sided pleural effusions in the setting of CHF. When the effusion is bilateral, the volume of fluid in each pleural space is roughly equal. All of the other etiologies listed may cause a pleural effusion, although each of the other etiologies classically causes an exudative effusion. Differentiating between an exudative and a transudative effusion is best accomplished by performing a thoracentesis and applying Light's criteria. Exudative effusions meet at least one of the three Light's criteria, whereas transudative effusions meet none of the Light's criteria (ratio of pleural fluid protein to serum protein >0.5; ratio of pleural fluid lactate dehydrogenase (LDH) to serum LDH >0.6; pleural fluid LDH greater than two thirds the upper limit of normal for serum LDH). Emergent thoracentesis is rarely indicated, and only necessary to stabilize a patient's respiratory or circulatory status (e.g., in the rare circumstance of a tension hydrothorax, or in the case of a very large effusion causing severe atelectasis and resulting in inadequate ventilation).

63 Answer D. Preseptal cellulitis is the most common complication of acute sinusitis. Orbital cellulitis may also occur and is often difficult to distinguish from preseptal sinusitis based on clinical examination alone. CT scans are generally able to differentiate between preseptal and orbital cellulitis. They also provide additional information about neighboring structures, including the sinuses. Cavernous sinus thrombosis is a rare, but life-threatening complication that results from extension of the infection through valve-free veins to the cavernous sinus. Patients typically present with severe headache as well as CN III and VI palsies along with retinal engorgement,

chemosis, proptosis, and a high fever. Like cavernous sinus thrombosis, meningitis is another uncommon intracranial complication. Other complications include brain abscesses, subdural empyema, orbital abscesses, maxillary cellulitis, and localized osteomyelitis.

- 64 Answer E. Labetalol antagonizes α -1, β -1, and β -2 adrenergic receptors. The β -blockade is much greater than the α -blockade, although both function to provide rapid, predictable BP control without causing reflex tachycardia. This blunting of the tachycardic response along with concomitant arteriolar vasodilation makes labetalol ideal as the initial single agent for management of aortic dissection, where reduction of heart rate is as important as reduction of BP. Orthostatic hypotension with oral labetalol is rare, but IV formulations can cause major changes. Nitroprusside and labetalol are roughly equal in their ability to control BP rapidly and predictably.
- 65 Answer A. Tetanus is a serious, toxin-mediated disease with a mortality of up to 50%. *Clostridium tetani*, a ubiquitous, gram-positive anaerobic bacterium, is the causative organism, producing tetanospasmin toxin which is responsible for the pathologic effects. Though clinical tetanus is rare in the United States, the underimmunized population is steadily increasing with immigration. Patients are inoculated with the bacteria during any break in the skin, such as simple wounds. Approximately one third of patients with clinically evident tetanus do not recall a preceding injury. Skeletal muscle spasm affecting the upper respiratory tract is the most common cause of death. Diffuse muscle rigidity, autonomic instability, hyperthermia, and rhabdomyolysis all accompany the pharyngeal and facial muscle spasm. Tetanus is a clinical diagnosis and cultures have no role in acute diagnosis or screening. Tetanus prophylaxis is initiated in childhood with a series of three vaccines, followed by boosters every 10 years for clean, uncontaminated wounds. Tetanus immunoglobulin is given to patients with dirty wounds who have never undergone primary vaccination. Treatment of clinically evident tetanus involves antibacterial therapy with penicillin and/or metronidazole, tetanus immunoglobulin, and aggressive supportive care with early intubation and tracheostomy placement.
- 66 Answer C. In the setting of SIADH, hypertonic saline (3%) must be given in order to correct hyponatremia. When isotonic normal saline is given (0.9%), the body "desalinates" it, delivering the salt to the kidneys to make concentrated urine, retaining the free water, and worsening the hyponatremia.

Therefore, in symptomatic patients with critical hyponatremia (sodium <120 mmol per L), hypertonic saline must be given. Neoplasms are the most common cause of SIADH and small cell lung carcinoma is the most common neoplasm associated with the disorder.

- 67 Answer D. The patient has evidence of acute epididymitis. In men older than 35 years, the most common cause is *E. coli*. In men younger than 35 years, *Chlamydia* is the number one cause, followed by gonococcus. It is crucial for the EP to distinguish between testicular torsion and epididymitis. Epididymitis is characterized by the gradual progression of symptoms, dysuria, and the presence of cremasteric reflexes. Focal epididymal swelling is followed by generalized edema and erythema of the scrotum. Low-grade fever is present in most patients. Only half the number of patients with epididymitis have leukocytes in the urine. Treatment involves antibiotics to cover suspected organisms based on age of the patient: Ceftriaxone plus doxycycline for patients younger than 35 years, and trimethoprim-sulfamethoxazole or ciprofloxacin for patients older than 35 years.
- 68 Answer A. The patient likely has a rib fracture or contusion given the focal pain and tenderness in her fifth rib. However, the true danger of a rib fracture is not the bony injury itself, but potential injury to the underlying structures, such as pleura, lung, liver, spleen, or kidney. The fifth rib is cephalad enough that an intra-abdominal injury would be less likely than thoracic injury. A chest x-ray is indicated to evaluate the lung parenchyma and pleural lines. Rib x-rays are not routinely indicated in patients with thoracic trauma, except in cases where multiple fractures are suspected or elderly patients are involved, as significant intra-thoracic or intra-abdominal injuries occur at higher frequency in these instances. Abdominal CT scan may be indicated with corroborative physical examination findings, but is never undertaken before routine x-rays of the chest or pelvis in the trauma patient. Brain CT scan and cervical spine radiographs are not indicated without loss of consciousness, altered mental status, focal neurologic deficit, headache, or neck pain/tenderness.
- 69 Answer A. The palatine tonsils are structures of lymphoid tissue in the posterolateral aspect of the oropharynx situated between the palatine arches (palatoglossal arch anteriorly and palatopharyngeal arch posteriorly). These are the tonsils to which most people are referring when they use the word, "tonsils." The single pharyngeal tonsil (also known as

the *adenoid*) is actually located at the posterior aspect of the nasopharynx, superior to the palatine tonsils. The lingual tonsils are collections of lymphoid tissue along the dorsal base of the tongue. Peritonsillar abscesses (also known as *quinsy*) occur near the superior pole of the palatine tonsils, thought to arise from a suppurative infection of the adjacent tonsil or from obstruction of Weber's glands at the superior pole of the palatine tonsil.

70 Answer C. This image reveals uterine prolapse. There are no contraindications to the manual reduction of uterine prolapse, although attempts at reduction may not be successful. The primary indication for reduction is symptomatic improvement. After reduction, the patient should be fitted with a pessary to prevent recurrence. The pessary is a short-term solution that may serve as a bridge to surgical repair. Pessaries should not be used in the setting of concomitant genital tract infection. (Figure courtesy of Mark Silverberg, MD. Reprinted in Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:353, with permission.)

71 Answer C. Propoxyphene has sodium channel-blocking properties that can cause QRS prolongation, especially when used in conjunction with other medications that block sodium channels (e.g., tricyclic antidepressants). Fentanyl may cause chest wall rigidity. Meperidine can cause seizures due to a toxic metabolite (normeperidine) and may lead to serotonin syndrome when used with other serotonergic agents. Hydrocodone has few extragastrointestinal side effects. Morphine can cause pruritus and hypotension due to histamine release.

72 Answer B. Pseudosubluxation of C2 on C3 is a common variant seen in almost half the number of pediatric patients younger than 8 years. Pseudosubluxation of C3 on C4 occurs in almost 15% of cases. Increased ligamentous laxity and more horizontally positioned facet joints in young children are the main causes. Unfortunately, this makes interpretation of cervical spine films more difficult than in the adult, especially because most cervical spine fractures in children occur in the C1-3 region. Pseudosubluxation is present when the spinolaminar line connecting the anterior portions of the spinous processes of C1 and C3 is within 2 mm of the C2 spinous process. Any greater distance indicates true subluxation.

73 Answer D. In acute respiratory distress syndrome (ARDS), the alveoli are flooded with protein-rich fluid due to leaky pulmonary capillaries. The result is poorly ventilated and poorly compliant alveoli (i.e.,

fluid-filled alveoli are difficult to distend). Owing to the presence of poorly compliant alveoli, both peak and plateau airway pressures in ARDS are higher than in healthy subjects. Ventilating such patients with "normal" or high tidal volumes pushes airway pressure higher and may result in barotrauma and further injury to the lung. The ARDS Network group of investigators published a study in 2000 describing a "lung protective" strategy in which such patients were ventilated with tidal volumes that were much lower than normal. The idea of this strategy is to reduce ventilator-associated lung injury as a result of alveolar over-distension from high tidal volumes and airway pressures. Owing to the low tidal volumes, however, such patients require higher PEEP levels to recruit alveoli in order to ensure adequate oxygenation. The goal is to use the lowest PEEP required to achieve an $\text{Fio}_2 \leq 0.50$. An inadvertent result of this strategy is hypoventilation and a resultant rise in Paco_2 levels (hypercapnia). Some studies suggest that the resulting acidosis (respiratory acidosis from high Paco_2 levels) may actually be protective, although the ARDS Network investigators treated the acidosis with bicarbonate infusions. An ideal strategy regarding this has not yet been developed.

74 Answer E. Although many infants outgrow their allergies to food (e.g., eggs, milk, and soy products), adults do not. Honeybees and wasps are both part of the order Hymenoptera, which is a large order of insects that is characterized by locked pairs of membranous wings. Honeybees and bumblebees are part of the Apidae family, whereas wasps, yellow jackets, and hornets are part of the Vespidae family. Although cross-reactivity is common among members of the vespidae family, little cross-reactivity occurs between different families of hymenoptera. Only 5% to 25% of adverse drug reactions are allergic. Topical or parenteral allergen exposure each provokes a more significant anaphylactic response than oral exposure. Atopy refers to the genetic predisposition to develop hypersensitivity to environmental allergens as is characterized by asthma, allergic rhinitis (hay fever), and atopic dermatitis. It also predisposes patients to develop anaphylactic reactions.

75 Answer B. Wolff-Parkinson-White (WPW) syndrome is the most frequently occurring accessory pathway syndrome. Patients have an accessory conductive pathway from the atria to the ventricles which pre-excites the ventricular myocytes before the AV node releases the normal sinoatrial depolarization. As a result, patients with WPW often have a shortened PR interval and a delayed QRS upstroke,

called the *delta wave*. The accessory pathway can cause reentrant dysrhythmias, of which atrioventricular nodal reentry (AVNRT) is the most common. In reentrant dysrhythmias, the accessory pathway can conduct retrograde (where the AV node conducts in the normal direction, producing a narrow QRS complex and an "orthodromic" pattern) or anterograde (where the AV node conducts backwards, producing a wide QRS complex and an "antidromic" pattern). Multifocal atrial tachycardia (MAT) is seen in the setting of chronic pulmonary disease and is not usually seen with WPW syndrome. AV blocks and torsade de pointes are not commonly seen in WPW syndrome.

Answer C. Laboratory testing has a limited, but important role in the evaluation of patients with abdominal trauma. The hematocrit is primarily important because it establishes a baseline value before resuscitation and redistribution. However, although the hematocrit is primarily useful for following serial levels in the setting of solid organ injury, it is also valuable in any patient who presents with a very low hematocrit in the setting of trauma because it most likely indicates that significant blood loss has already occurred. Liver enzymes are not helpful and are not used to distinguish between minor and major liver contusions or lacerations. Although often elevated in the setting of pancreatic injury, serum amylase and lipase are nonspecific and poorly sensitive. Therefore, normal levels do not exclude pancreatic injury and high levels may be due to a host of other causes. Although conflicting data exist regarding the utility of microscopic hematuria in pediatric patients, most authors agree that any degree of microscopic hematuria in pediatric patients is an indication for CT scanning. Various thresholds have been established, but at least a few studies have correlated any amount of microscopic hematuria with intra-abdominal organ injury. CT scanning has supplanted IV pyelogram in this regard. Furthermore, the presence of microscopic hematuria may signify injury to the liver or spleen as well as the kidneys.

Answer D. Hyperemia and erythema are expected findings upon rewarming frostbitten tissue, but a residual violaceous color is an ominous sign. Positive prognostic signs include a return to normal pliability, early return of normal sensation, and early formation of large clear blebs in the affected area. Persistent firmness of the SQ tissue, lack of edema, or the delayed development of hemorrhagic blebs all portend a worse outcome.

Answer E. The pain due to gastroesophageal reflux (GERD) may radiate to all of the same places that commonly occur in the setting of cardiac

ischemia. Radiation of pain is a variable feature of both entities and should not be relied upon to differentiate between the two. Both types of pain may be precipitated by emotional or physical stress and may abate once that stress is relieved (either by rest or relaxation). Nevertheless, the pain due to GERD is three times more likely to radiate to the abdomen than in cardiac ischemia. In addition, pain due to GERD is more common after meals, and patients may complain of a feeling of "fullness." Of course, the most common manifestation of GERD is heartburn, although patients with cardiac ischemia may again feel similar symptoms.

Answer B. The slit lamp examination demonstrates dendritic lesions with fluorescein uptake characteristic of herpes simplex keratitis. The dendritic lesions may scar, and ocular HSV is a common cause of corneal blindness in the United States. Management involves oral and/or topical antivirals and ophthalmologic consultation to assess for surgical management. Topical steroids are absolutely contraindicated as they may cause worsening of the corneal epithelial defect. Acetazolamide is used to increase aqueous humor excretion as part of non-invasive temporizing therapies for acute glaucoma attacks. Erythromycin is used to treat corneal ulcers or prevent infections from occurring in patients with corneal abrasions. Ceftriaxone is used in patients with hyperacute bacterial conjunctivitis, which is usually due to gonococcal infection. (Figure from Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001, with permission.)

Answer B. Rabies is a virus that carries virtually 100% mortality. Humans contract the virus from being bitten by infected animals. Bats are the **number one** vector, followed by skunks, raccoons, and foxes. Dogs and cats may also carry rabies, but the vast majority of domesticated animal bites do not cause rabies, due to vaccination programs. The virus is transmitted from the animal's **saliva** through open skin into the victim's bloodstream. It then jumps onto peripheral nerves and travels up the spinal cord to the brain. The incubation period in humans lasts 1 to 3 months. A nonspecific viral prodrome affects most patients. Specific symptoms of rabies include altered mental status and hydrophobia (inability to swallow water or saliva due to hyperactive airway reflexes). Coma and death are inevitable, and no effective treatment exists once rabies is clinically evident. Postexposure prophylaxis, consisting of local wound care, human rabies immune globulin (HRIG), and rabies vaccine, is essential to prevent rabies infection.

- 81** Answer D. Amniotic fluid embolism (AFE) is a rare complication of pregnancy also known as the *anaphylactoid syndrome of pregnancy*. Through a still unclear mechanism, amniotic fluid gains entry into the maternal circulation and triggers an immense inflammatory cascade resulting in pulmonary vasoconstriction, pulmonary capillary leak, and myocardial depression. Clinically, patients develop acute hypoxia, hypotension, and altered mental status. Disseminated intravascular coagulation and seizures may also occur. In patients with eclamptic seizures, however, hypertension will be present instead of the profound shock of AFE. AFE most commonly occurs during labor and delivery or within 30 minutes of delivery although it may occur during the second and third trimesters and it has been reported as a rare complication of amniocentesis. Treatment is entirely supportive and the mortality rate exceeds 60%. Neurologic deficits are common among survivors.
- 82** Answer B. Odontoid fractures are the most common cervical spine fractures in the elderly. They usually result from falls from standing height with accompanying head trauma. For this reason, the importance of an adequate open-mouth odontoid radiograph cannot be overemphasized. More than one third of cervical spine fractures in the elderly involve multiple vertebrae, which are usually (but not always) contiguous. Most cervical spine fractures in the elderly (as in children) involve C1-3.
- 83** Answer E. Though a transient tachycardia may occur, sinus bradycardia develops and the heart progressively slows as the body cools. In fact, the finding of a relative tachycardia in a hypothermic patient should trigger a search for a cause. The PR, QRS, and QT intervals may all become prolonged although this finding is most common in the QT segment and also correlates with the degree of hypothermia. J waves, or Osborn waves, are the most discussed EKG feature in hypothermia. They are additional waves at the junction of the QRS complex and the ST segment and tend to be upright in aVL, aVF, and the lateral precordial leads. Any atrial or ventricular dysrhythmia may occur, but atrial fibrillation is the most common and it usually spontaneously converts to sinus rhythm upon rewarming.
- 84** Answer C. *Legionella* spp., along with *Chlamydia* spp. and *Mycoplasma* spp. all respond to macrolide therapy. The remaining organisms are usually treated with cephalosporins or fluoroquinolones.
- 85** Answer A. The platysma is the most superficial muscular layer of the neck, as it is sandwiched between the superficial and deep fascia of the neck. There are no vital structures superficial to the platysma. Therefore, patients with penetrating trauma who have an intact platysma can be given local wound care and discharged for routine follow-up. However, although neck wounds may be carefully examined to determine whether the platysma is intact, wounds should never be probed outside of the operating room. If, after shallow examination, there is any uncertainty regarding platysma integrity, a surgeon should be consulted for further evaluation and treatment.
- 86** Answer B. Diverticulosis is the most common cause of lower gastrointestinal bleeding (LGIB), which may be massive in 5% of cases. However, most cases of LGIB due to diverticulosis are mild and resolves without intervention. Interestingly, although most diverticula are located in the left (descending) or sigmoid colon, most *bleeding* diverticula are located in the right colon. This is fortuitous, because most cases of angiodysplasia, a common cause of severe LGIB in the elderly, are also located in the right colon. Angiographic studies performed to localize bleeding, therefore, canalize the superior mesenteric artery (SMA) first.
- 87** Answer E. Traumatic subarachnoid hemorrhage (SAH) results from bleeding in the subarachnoid vessels, causing blood to accumulate in around the brain parenchyma and in the sulci. It is an extremely common cause of traumatic intracranial hemorrhage. Symptoms include headache, vomiting, and photophobia, but focal neurologic deficits are rare due to the diffuse nature of the bleeding and generally low incidence of accompanying increased intracranial pressure. Cerebral vasospasm may occur as a result of the SAH and can be attenuated by the use of peripheral calcium channel blockers such as nicardipine.
- 88** Answer D. The patient has a prominent lateral clavicular border with the deltoid and humeral margin displaced inferiorly. The most likely cause for this is an acromioclavicular separation due to a torn acromioclavicular ligament. Radiographs will demonstrate this injury more definitively. Management involves sling immobilization acutely with orthopedic follow-up. If there were a shoulder dislocation, it would be impossible for the patient to touch his opposite shoulder with the affected hand. A sternoclavicular dislocation is not apparent due to the lack of abnormalities noted on the medial sternal border. (Figure courtesy of Mark Silverberg, MD. Reprinted in Silverberg M. *Greenberg's text-atlas of*

emergency medicine. Lippincott Williams & Wilkins; 2004:501, with permission.)

89 Answer E. Approximately 30% to 50% of patients with adenovirus pharyngitis have an associated conjunctivitis, which is typically a unilateral, follicular conjunctivitis. Patients presenting with conjunctivitis, pharyngitis, and fever are said to have pharyngoconjunctival fever, which is diagnostic for adenovirus infection. No further testing is required. Outbreaks of community-acquired pharyngoconjunctival fever due to adenovirus have been attributed to exposure to water from contaminated swimming pools as well as fomites from shared pool towels. The EP should keep this in mind when treating young children with pharyngitis and conjunctivitis in the summer. In the absence of conjunctivitis, it is not possible to differentiate adenovirus-induced pharyngitis from group A β -hemolytic streptococcal pharyngitis as both organisms may cause an intense exudative pharyngitis.

90 Answer C. The patient presents with a truncal, morbilliform rash with history of pharyngitis and concomitant antibiotic use. His rash is likely due to an aminopenicillin in association with viral infectious mononucleosis. Classically caused by ampicillin, this rash may also be caused amoxicillin. Any of the antibiotics listed may cause a drug rash, but amoxicillin is most likely to do so in the presence of infectious mononucleosis. (Figure from Ostler HB, Maibach HI, Hoke AW, et al. *Diseases of the eye and skin: A color atlas*. Philadelphia: Lippincott Williams & Wilkins; 2004, with permission.)

91 Answer D. Polymicrobial infections are the rule in peritonsillar abscess (PTAs). Although *Fusobacterium* sp. are isolated, so are numerous other anaerobic and aerobic bacteria, including *Peptostreptococcus* sp., *Porphyromonas* sp., and *Prevotella* sp., group A β -hemolytic *Streptococcus*, *H. influenzae*, and *S. aureus*. Historically, many patients with PTAs were subjected to immediate tonsillectomy. However, either needle aspiration or incision and drainage are effective therapy in concert with antibiotics. Most of the debate in the management of PTAs focuses on the best drainage strategy. To date, the evidence does not clearly favor one method, and both methods appear to be effective. Regardless of the method used, drainage should be performed with the patient sitting upright to reduce the chance of aspiration. Suction equipment should also be assembled at the bedside to remove purulent debris. It is not possible to accurately differentiate between the presence of a PTA and peritonsillar cellulitis upon physical examination. Furthermore, because collections of

pus may be highly viscous, a needle placed into the center of an abscess may not drain any material, resulting in a falsely negative aspirate. Patients with suspected PTAs but negative aspirates can undergo CT to determine if an abscess is present.

92 Answer B. This patient has Horner's syndrome caused by disruption to the sympathetic fibers that encircle the carotid artery. Division of the sympathetics results in ptosis, miosis, and anhidrosis on the side of the injury and can occur after either blunt or penetrating trauma. Though the presence of Horner's syndrome is not a life-threatening emergency, it may represent a life-threatening vascular emergency due to the proximity of the sympathetic chain to the carotid artery. Therefore, all patients with Horner's syndrome should have a definitive evaluation of the carotid artery to exclude intimal injury (e.g., carotid angiography or helical CT angiography). Interestingly, delayed presentation of neurologic deficits is typical of vascular injuries to the neck due to blunt trauma. In the absence of Horner's syndrome, most patients experience stroke symptoms between 1 and 24 hours after injury due to carotid or vertebral artery dissection or thrombosis. Vascular injury should be suspected in all patients with neurologic findings that are incongruent with head CT findings.

93 Answer A. Although the patient has a history of rheumatoid arthritis, which may be responsible for the symptoms, it is crucial to exclude septic arthritis by aspiration of the joint and synovial fluid analysis. Rheumatoid arthritis, like any process that causes joint destruction, predisposes patients to developing septic arthritis. MRI is not useful in the acute setting and will unnecessarily delay appropriate management. Colchicine and indomethacin are used for acute gouty flares and without a clear diagnosis of crystals in the synovial fluid, neither is indicated. Stress-dose steroids may be reasonable in this patient, but should not precede evaluation for a septic joint.

94 Answer A. Choice B is seen in glaucoma, choice C in central retinal vein occlusion, choice D in vitreous hemorrhage, and choice E in macular degeneration.

95 Answer A. Owing to anatomic and physiologic differences, pediatric blunt trauma patients tend to exhibit more injuries to specific organs than adults. Hypotension is an extremely late sign of hemorrhagic shock in pediatric patients and often signals imminent cardiac arrest. Extreme tachycardia in the pediatric patient may compensate for severe acute blood loss and maintain an adequate cardiac output for a brief period of time. Most

pediatric patients lack sufficient amounts of adipose tissue to withstand the cold environment of the trauma resuscitation room and unwarmed IV fluid administration, putting them at much higher risk than adults for serious hypothermia. Solid organs, including liver, spleen, and kidney, are more often injured in pediatric patients due to the lower amount of surrounding extra-abdominal soft tissue. Because children's heads are proportionally larger than those of adults, serious head injury is more common in children.

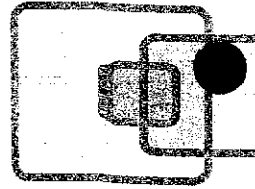
- 96** Answer B. The prevalence of mitral valve prolapse (MVP) is 10%. MVP most commonly causes chest pain and palpitations, but lightheadedness and dyspnea may also occur. Overt signs of heart failure such as peripheral edema and orthopnea are rare. Patients with MVP are at increased risk for dysrhythmias, endocarditis, and sudden death.
- 97** Answer B. Copperheads are pit vipers that are part of the Crotalidae family. Copperheads are typically found in the eastern United States and are generally considered less toxic than other pit vipers, rarely requiring treatment. Mild envenomations are distinguished by the presence of only local symptoms and minimal swelling. Patients with swelling that extends beyond 15 cm from the bite site or patients who develop systemic symptoms or abnormal coagulation tests have experienced moderate to severe envenomation.
- 98** Answer C. Human rabies immune globulin (HRIG) should be administered as close to the bite site as possible. When this is not suitable (such as in the digits), give as much HRIG as possible at the bite site and the remainder at any skeletal muscle distant

from the site. Choices A, B, and D are all reasonable choices. The distal extremities, especially the penis, should not be used as HRIG sites. Rabies vaccine should be administered at a site distant from both the bite and HRIG. Along with passive and active immunization, local wound care is extremely important as soap and povidone-iodine cleansing solutions are 100% virucidal when used early enough.

- 99** Answer A. Octreotide is a longer-lasting, synthetic analog of somatostatin. It inhibits the release of several vasodilatory hormones such as glucagon and has direct effects on vascular smooth muscle. The end result of its effects is selective vasoconstriction of the splanchnic vasculature, thereby decreasing pressure and bleeding in existing esophageal varices. Propranolol is useful as a prophylactic adjunct to prevent rebleeding. Vasopressin has been used in the past to control variceal hemorrhage but it has prohibitive side effects, including myocardial ischemia. Therefore, it is currently not recommended for routine use.

- 100** Answer B. The patient has a dermatomal, vesicular rash consistent with shingles, caused by VZV. Shingles is due to reactivation of dormant VZV—primary VZV is also known as *chickenpox*. Immunocompromised patients may have disseminated zoster infection, which spreads beyond the initial dermatome and systemic involvement. Patients with shingles may require antiviral therapy with acyclovir (or equivalent), pain medication, and steroid therapy. Recurrent infection and postherpetic neuralgia are the most common complications. (Figure reprinted with permission from Fleisher GR, Baskin MN. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003:214.)

Test 3



Questions

1. Which of the following is the most common complication of otitis media?

- (A) Tympanic membrane perforation
- (B) Hearing loss
- (C) Labyrinthitis
- (D) Meningitis
- (E) Brain abscess

2. A 13-year-old boy is brought to the emergency department (ED) by his mother with a 3-week history of a nonproductive cough that "won't go away." She asks you if he might have "walking pneumonia." Which of the following is true?

- (A) Walking pneumonia may frequently be caused by *Chlamydia pneumoniae*, a sexually transmitted organism.
- (B) This is usually caused by Epstein-Barr virus, the same virus that causes "mono," and it may take several weeks for him to improve.
- (C) The patient should be admitted to the ICU for IV antibiotics as walking pneumonia

rapidly progresses to sepsis and respiratory failure.

- (D) The most common causes are *Mycoplasma pneumoniae* and *C. pneumoniae*, and macrolides are the antibiotics of choice.
- (E) If his chest x-ray is normal, then a diagnosis of walking pneumonia is less likely.

3. A 22-year-old man presents with palpitations. He reports no chest pain, shortness of breath, or lower extremity edema. He states that he "got really drunk" the night before. He denies any past medical history, family history, or illicit drug use. His examination is unremarkable except for irregular tachycardia. His electrocardiogram (EKG) is shown in Figure 3-1. Which of the following is the most likely etiology?

- (A) Myocardial infarction (MI)
- (B) Pulmonary embolism
- (C) Alcohol use
- (D) Hypertension
- (E) Diabetes

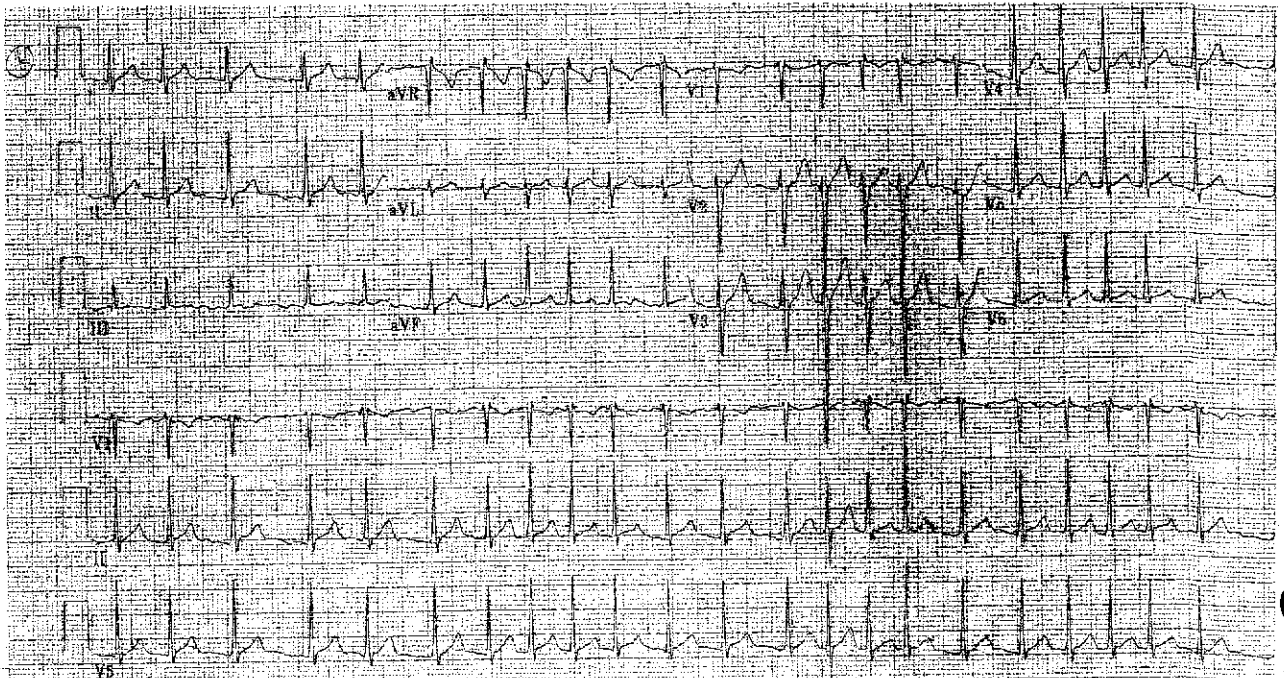


Figure 3-1. (See color insert.)

- 4 Which of the following is the most effective therapy for acute arsenic poisoning?

(A) Activated charcoal
(B) Ipecac
(C) Dimercaprol
(D) Penicillamine
(E) Deferoxamine

- 5 A 23-year-old man presents to the ED after being kicked in the head, with loss of consciousness. He is awake and alert and complains of a headache. Brain computed tomography (CT) is performed and a slice is shown. Right after the CT scan, he becomes unresponsive. Which of the following is the most appropriate next step in management (see Fig. 3-2)?

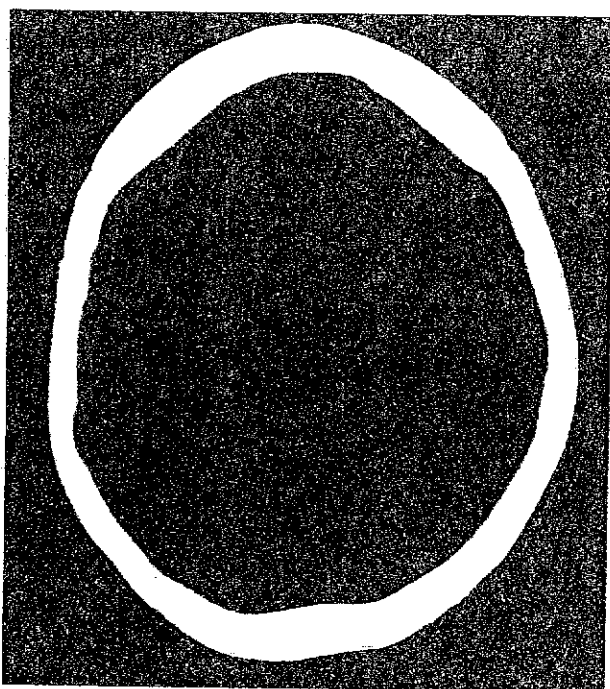


Figure 3-2.

- (A) Burr hole placement
(B) Endotracheal intubation
(C) Diagnostic peritoneal lavage (DPL)
(D) Emergent thoracotomy
(E) Nasogastric tube placement
- 6 Which of the following is true regarding cluster headaches?
- (A) The pain is typically bilateral.
(B) They occur more commonly in men.
(C) The average age of onset is 45 years.
(D) The average cluster period lasts for 1 week.
(E) Pain typically occurs in the V2 distribution of the trigeminal nerve.

- 7 Which of the following is true regarding temporomandibular joint (TMJ) dislocations?

(A) Most of them are posterior.
(B) The patient is unable to open the mouth in bilateral dislocations.
(C) The jaw is rotated toward the affected side in a unilateral dislocation.
(D) The patient will present with a protruding mouth.
(E) All of the above.

- 8 Which of the following is true regarding neck trauma?

(A) Delayed neurologic deficits after blunt neck trauma suggest carotid artery dissection.
(B) All patients with suspected esophageal injury should receive barium contrast esophagram.
(C) Zone III injuries are most amenable to surgical exploration.
(D) All neck wounds should be probed to determine the depth of the wound and integrity of vital structures.
(E) Impaled objects should always be removed in patients with penetrating neck trauma.

- 9 You are working in the ED when a 74-year-old woman with chronic obstructive pulmonary disease (COPD) presents with an acute COPD exacerbation. You start her on bilevel positive airway pressure (BiPAP) at a rate of 10, an inspiratory positive airway pressure (IPAP) of 10 mm Hg and an expiratory positive airway pressure (EPAP) of 4 mm Hg. Twenty minutes later, the patient's oxygenation has not improved. Which of the following changes would most likely increase this patient's oxygenation?

(A) Increase the patient's IPAP from 10 to 15.
(B) Increase the patient's rate from 10 to 12.
(C) Decrease the patient's EPAP from 4 to 2.
(D) Increase the patient's EPAP from 4 to 7, and the IPAP from 10 to 15.
(E) Decrease the patient's EPAP from 4 to 2, and decrease the IPAP from 10 to 5.

- 10 A 75-year-old man presents with a fall on outstretched hand. Radiographs demonstrate a distal radius fracture with dorsal displacement of the distal segment. Which of the following is the most likely nerve injury?

(A) Median
(B) Radial
(C) Ulnar
(D) Axillary
(E) Vagus

- 11 A 22-year-old man presents with left-sided facial and periorbital pain after a fight. A CT scan reveals the following image shown in Figure 3-3. Which of the following examination findings may be present?

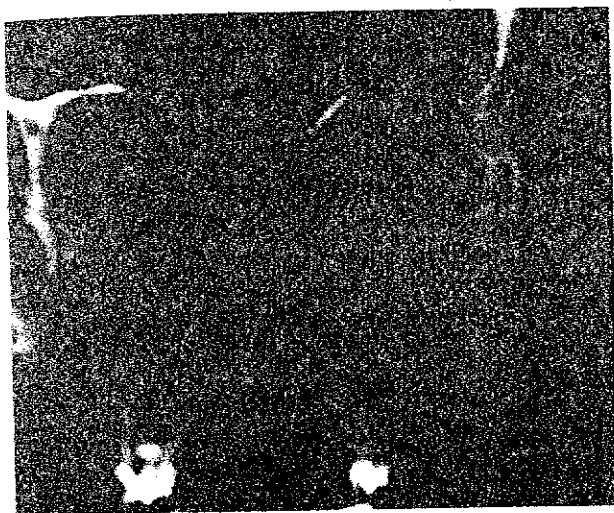


Figure 3-3.

- (A) Hypoesthesia over the maxilla
 - (B) Inability of upward gaze
 - (C) Enophthalmos
 - (D) Periorbital emphysema
 - (E) All of the above
- 12 Which of the following is true regarding Rocky Mountain spotted fever (RMSF)?
- (A) It is most commonly transmitted by ticks living in the Rocky Mountain range of North America.
 - (B) Owing to treatment toxicity, antibiotics should not be started until a positive Weil-Felix reaction is obtained.
 - (C) The peripheral white blood cell (WBC) count is usually normal.
 - (D) Despite antibiotic therapy, the case fatality rate is 50%.
 - (E) Close contacts of the patient should be treated with a 1-week course of prophylactic doxycycline.
- 13 Which of the following is true regarding patients with temporal (or giant cell) arteritis?
- (A) The most specific finding is jaw claudication.
 - (B) Permanent visual loss occurs in 50% of patients.
 - (C) Treatment with corticosteroids should be withheld until there is biopsy-proved disease.
 - (D) Vertigo is the most sensitive clinical finding.
 - (E) The peak age of onset is 40 years.

- 14 A 20-year-old previously healthy female college student presents to the ED with diarrhea. She went on a camping trip 2 weeks ago but denies any other travel. She notes seven to eight watery, foul-smelling stools per day and generalized abdominal cramping. A test for fecal leukocytes, ordered in triage after the patient had a large diarrheal stool, is negative. Which of the following is the best management?

- (A) Azithromycin 500 mg daily for 3 days
- (B) Metronidazole 250 mg t.i.d. for 7 days
- (C) Ciprofloxacin 500 mg b.i.d. for 3 days
- (D) Supportive care with IV hydration and antimotility agents
- (E) Vancomycin 125 mg q.i.d. for 10 days

- 15 A 65-year-old woman with a history of chronic alcoholism presents with confusion, ataxia, and nystagmus. Which of the following is the most appropriate therapy?

- (A) Lorazepam
- (B) Haloperidol
- (C) Thiamine
- (D) Pyridoxine
- (E) Potassium

- 16 Which of the following is the most common cause of viral otitis media?

- (A) Respiratory syncytial virus (RSV)
- (B) Influenza
- (C) Rhinovirus
- (D) Adenovirus
- (E) Human immunodeficiency virus (HIV)

- 17 A 7-year-old girl is brought in by her father after choking on a plastic toy. She was coughing violently and gasping in the car, so the father tried the Heimlich maneuver and a blind finger sweep but she seemed to get worse. His daughter is now unconscious and cyanotic. After performing a jaw-thrust maneuver, you fail to locate a foreign body. Attempts to place an endotracheal tube fail, as the tube seems to be striking an object. What is the best next step?

- (A) Laryngeal mask airway
- (B) Surgical cricothyroidotomy
- (C) Back blows to dislodge the foreign body
- (D) Blind finger sweeps to remove the foreign body
- (E) Needle cricothyroidotomy

- 18 Which of the following is true regarding patients with a primary spontaneous pneumothorax?

- (A) Pleuritic chest pain and dyspnea are the most common symptoms.

- (B) Hemoptysis is present in most patients.
- (C) It occurs most frequently in women aged 20 to 40 years.
- (D) Without treatment, symptoms tend to intensify within 24 to 48 hours.
- (E) Atrial fibrillation is the most common cardiac rhythm in the acute setting of a spontaneous pneumothorax.

19 A 4-month-old male infant presents with mild abdominal distension, pencil-thin stools, failure to thrive, and bilious vomiting. Digital rectal examination reveals an empty rectal vault. Which of the following is the most likely cause of these symptoms?

- (A) Intussusception
- (B) Pyloric stenosis
- (C) Gastroesophageal reflux disease (GERD)
- (D) Hirschsprung's disease
- (E) Incarcerated hernia

20 A 65-year-old man presents with sudden, painful loss of vision in his right eye. His visual acuity is markedly decreased in the affected eye. Which of the following is the most likely cause of his symptoms?

- (A) Acute angle closure glaucoma
- (B) Central retinal artery occlusion
- (C) Central retinal vein occlusion
- (D) Retinal detachment
- (E) Vitreous hemorrhage

21 Which of the following antidysrhythmics does phenytoin most closely resemble?

- (A) Procainamide
- (B) Amiodarone
- (C) Metoprolol
- (D) Lidocaine
- (E) Verapamil

22 A 63-year-old man with a history of multiple myeloma presents with acute onset of generalized weakness, blurry vision, diffuse mucosal bleeding, and headache. A complete blood count and comprehensive chemistry panel is sent, but the laboratory is unable to perform the analysis, citing "inappropriate blood sample." Which of the following is the most appropriate definitive management?

- (A) Hemodialysis
- (B) Plasmapheresis
- (C) Platelet transfusion
- (D) Packed red blood cell (RBC) transfusion
- (E) Erythropoietin

23 Which of the following is the most important factor in determining the risk of rupture of an abdominal aortic aneurysm (AAA)?

- (A) Age of the patient
- (B) Hypertension
- (C) Size of the aneurysm
- (D) Location of the aneurysm
- (E) Male gender

24 A 26-year-old woman presents with a rash on her legs (see Fig. 3-4). She states that she has been feeling somewhat tired lately and notes generalized body and joint aches, as well as a sore throat. Over the last day or so, she has noted a rash developing over her anterior shins. The rash is very tender to the touch and is non-pruritic. Which of the following is true?

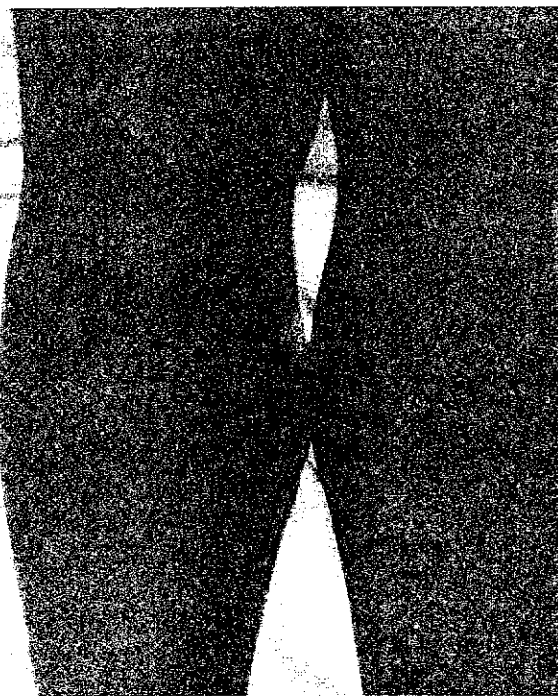


Figure 3-4.

- (A) She should be referred to a dermatologist for a biopsy.
- (B) First-line treatment is with aspirin or nonsteroidal anti-inflammatory drugs NSAIDs.
- (C) These lesions do not occur in children.
- (D) The rash tends to be nontender and pruritic.
- (E) These lesions tend to be recurrent over a patient's lifetime.

25 A 26-year-old man with a history of bipolar disorder is brought in by his mother with a chief complaint of

agitation. She states that her son has been very anxious and restless, has not been sleeping, and abruptly stopped taking his lithium medication 2 days ago. In the ED, his vital signs include a temperature of 104.1°F, pulse of 120, with sinus tachycardia visible on the monitor, and a blood pressure (BP) of 140/70. On examination he is mildly agitated, warm and diaphoretic, tremulous, and has a slight lid lag. Which of the following is the next best step?

- (A) Oral lithium administration
- (B) Intravenous propranolol administration
- (C) Oral administration of Lugol's solution
- (D) Oral aspirin administration
- (E) Intravenous dantrolene administration

- 26 Parents of an 11-month-old male infant bring him to your ED with a rash (see Fig. 3-5). They state that he appeared to have some discharge from his eyes and then developed a diffuse, tender "redness" to his skin, which had a "rough" feel to it. Their pediatrician diagnosed him with a viral syndrome and prescribed oral antipyretics as needed. Since then, his skin appears to have wrinkled, formed blisters, and is now peeling in large sheets. Which of the following is the treatment of choice?



Figure 3-5.

- (A) Amoxicillin
 - (B) Nafcillin
 - (C) Valacyclovir
 - (D) Corticosteroids
 - (E) Continue with supportive care only
- 27 Which of the following is true about peptic ulcer disease?
- (A) Pain that wakes patients in the middle of night is typical of duodenal ulcers.
 - (B) The incidence of bleeding from gastric ulcers is approximately two times that of duodenal ulcers.

- (C) *Helicobacter pylori* is the major risk factor linked to the development of duodenal ulcers but has almost no role in the development of gastric ulcers.
- (D) Barium contrast is the diagnostic study of choice to diagnose peptic ulcer disease.
- (E) Only 50% of those people infected with *H. pylori* will develop a peptic ulcer in their lifetime.

- 28 Which of the following is true regarding orbital wall fractures?

- (A) The orbital floor is the weakest part of the orbit.
- (B) Globe injuries occur in almost all orbital floor fractures.
- (C) The teardrop sign refers to fat extending from the globe into the optic nerve.
- (D) Antibiotics are indicated in all orbital wall fractures.
- (E) Patients with orbital wall fractures should be instructed to blow their noses every 6 hours to reduce nasal congestion.

- 29 A 22-year-old man presents with a painful, red area on his right leg for the last 3 days. It is spreading up his leg and he noted fevers, chills, and lightheadedness today. He also describes a sunburn-like rash on his chest, back, and arms but denies recent sun exposure. Vital signs are 102.5°F, 112, 22, 82/45, 94% RA. Which of the following is true regarding this patient?

- (A) *Pseudomonas* is the most likely cause.
- (B) A bacterial toxin is responsible for the pathologic effects.
- (C) Blood cultures are almost always positive.
- (D) Mortality is <1%.
- (E) Intravenous fluids usually worsen the clinical outcome.

- 30 Which of the following is characteristic of rotavirus diarrhea?

- (A) Fecal leukocytes
- (B) Fecal erythrocytes
- (C) Summer predominance
- (D) Duration of 1 month
- (E) Peak age between 6 months and 2 years

- 31 A mother brings in her 7-year-old daughter to the ED with a chief complaint of painful vaginal lesions and "bumps," burning dysuria, and generalized malaise (see Fig. 3-6). On examination, you note tender inguinal lymphadenopathy and the lesions show Which of the following is the most likely cause of her symptoms?



Figure 3-6.

- (A) Herpes simplex virus type 2 (HSV-2)
 (B) Syphilis (*Treponema pallidum*)
 (C) Chancroid (*Hemophilus ducreyi*)
 (D) Lymphogranuloma venereum (LGV, *Chlamydia trachomatis*)
 (E) Granuloma inguinale (*Calymmatobacterium granulomatis*)
32. Aside from the eyes, which of the following is the most common site of pathologic effect of methanol overdose?
- (A) Basal ganglia
 (B) Facial nerve
 (C) Vagus nerve
 (D) Olfactory nerve
 (E) Glossopharyngeal nerve
33. Which of the following is true regarding idiopathic thrombocytopenic purpura (ITP)?
- (A) Five-year mortality is 50%.
 (B) Aspirin is the treatment of choice in adults.
 (C) Treatment in children is usually supportive.
 (D) There is a male predominance in adults.
 (E) Platelet therapy is indicated in patients with $<50,000$ cells per mm^3 .
34. The most widely used critical care ventilatory strategy in acute asthmatic patients aims to accomplish which of the following objectives?
- (A) Patients are purposefully hypoventilated, maintaining elevated Paco_2 values, to keep their airway pressures at safe levels to avoid barotrauma.
 (B) Patients are purposefully hyperventilated to bring their Paco_2 levels back to normal because ventilatory failure is the primary reason for intubating patients in status asthmaticus.
 (C) The initial ventilator settings are no different than for a patient intubated for airway protection due to altered mental status.
 (D) Inspiratory flow rates are set very low to avoid causing very high peak airway pressures due to bronchoconstriction.
 (E) The inspiratory flow curve should be a ramp-style wave instead of a square-style wave to maximize expiratory time.
35. Which of the following is the most common identified cause of bacteremia in children?
- (A) *Neisseria meningitidis*
 (B) *Hemophilus influenzae*
 (C) *Streptococcus pneumoniae*
 (D) *Staphylococcus aureus*
 (E) *Pseudomonas aeruginosa*
36. Which of the following is true regarding avulsed and subluxed teeth?
- (A) Avulsed teeth can almost always be successfully reimplanted if returned to their sockets within 3 hours.
 (B) Avulsed primary teeth are never reimplanted.
 (C) The best known transport medium for avulsed teeth is milk.
 (D) Teeth can be temporarily secured for up to 1 week with a periodontal pack made from resin and catalyst paste.
 (E) Avulsed teeth should be scrubbed with a povidone-iodine sponge to kill microbes before reimplantation.
37. Which of the following is true regarding diaphragmatic injuries?
- (A) Left-sided injuries are three times as common as right-sided.
 (B) The majority heal spontaneously.
 (C) Delayed herniation of abdominal contents into the thorax is extremely rare.
 (D) Almost all cases are caused by penetrating trauma to the abdomen.
 (E) Ultrasonography is the diagnostic modality of choice.
38. Diagnosis of which of the following findings is the primary utility of the focused assessment of sonography in trauma (FAST) scan?
- (A) Pelvic fracture
 (B) Renal injury
 (C) Diaphragmatic rupture
 (D) Hemoperitoneum
 (E) Aortic injury

- 39 A 27-year-old woman without past medical history presents with 2 days of pain in her right ear. The patient notes that the symptoms started with an itchy ear which progressed to pain, discharge, and hearing loss. Examination reveals an afebrile patient who is nontoxic, moderate tenderness on manipulation of the auricle, erythema and edema of the tympanic canal, and no external rash. Cranial nerve examination is normal. Which of the following will be most helpful in treating this condition?
- (A) Antihistamines
 - (B) Tympanostomy tubes
 - (C) Systemic antivirals
 - (D) Adenoidectomy
 - (E) Acetic acid otic washes
- 40 The most common sexually transmitted organism in the United States is
- (A) *T. pallidum*.
 - (B) *C. trachomatis*.
 - (C) *Neisseria gonorrhoeae*.
 - (D) Herpes simplex virus.
 - (E) *H. ducreyi*.
- 41 Which of the following is true regarding scorpion envenomation?
- (A) Scorpion envenomation is typically more severe in adults than in children.
 - (B) Narcotic analgesics should be the first-line agents for pain control.
 - (C) Envenomation by United States scorpions generally results in significant cardiopulmonary collapse.
 - (D) Extreme hypertension may be managed with nitroprusside.
 - (E) All of the above.
- 42 Among the elderly, which of the following is the most common cause of delirium?
- (A) Stroke
 - (B) Electrolyte abnormalities
 - (C) Infection
 - (D) Medication interactions or side effects
 - (E) Trauma
- 43 An otherwise healthy 22-year-old man presents to the ED after a "spider bite." He states that he felt a pinprick sensation on his hand when he lifted the hood of an old car he has been storing in his driveway. He continued working, but soon developed crampy muscle aches that spread up his arm and now seem most severe in his chest and abdomen. In the ED, his abdomen is rigid and the patient is complaining of dizziness, nausea, and severe "stomach cramps." Which of the following is the likely culprit?
- (A) Tarantula
 - (B) Hobo spider
 - (C) Brown recluse spider
 - (D) Wolf spider
 - (E) Black widow spider
- 44 Which of the following is the most common cause of gastritis?
- (A) Alcohol
 - (B) Caffeine
 - (C) *H. pylori*
 - (D) Aspirin or NSAID use
 - (E) Crohn's disease
- 45 The most common cause of hypomagnesemia in the ED is likely:
- (A) Alcoholism
 - (B) Diuretic therapy
 - (C) Acute tubular necrosis
 - (D) Chronic diarrhea
 - (E) Diabetic ketoacidosis
- 46 Which of the following is the most common risk factor associated with aortic dissection?
- (A) Smoking
 - (B) Atherosclerosis
 - (C) Marfan's syndrome
 - (D) Hypertension
 - (E) Bicuspid aortic valve
- 47 Which of the following is one of the Kanavel's cardinal signs of flexor tenosynovitis?
- (A) Symmetrical swelling of the digit
 - (B) Tenderness to palpation of the volar aspect of the digit
 - (C) Pain upon passive extension of the digit
 - (D) Maintenance of the digit in a flexed posture
 - (E) All of the above
- 48 Which of the following is true regarding sick sinus syndrome?
- (A) Long-term treatment generally involves pacemaker and antidysrhythmics.
 - (B) The condition is more common in patients younger than 40 years.
 - (C) Lidocaine is the mainstay of management of acute tachycardias.
 - (D) Atropine is ineffective at improving bradycardia.
 - (E) Atrial fibrillation is almost never present.

- 49 A 78-year-old man presents with marked left foot and mild left arm weakness and hypoaesthesia. In addition, his family states that he is not acting himself and seems to be having difficulty making decisions. Which of the following arteries is most likely affected?

(A) Vertebrobasilar artery
(B) Posterior cerebral artery
(C) Middle cerebral artery
(D) Anterior cerebral artery
(E) None of the above

- 50 Which of the following is true regarding nitropruside?

(A) Cyanide toxicity is common.
(B) Extravasation causes severe local skin necrosis.
(C) It decreases intracranial pressure (ICP).
(D) It is safe for use during pregnancy.
(E) It has a delayed onset of action compared with other IV antihypertensive agents.

- 51 A 5-year-old boy is brought by his mom for a "rash" on his back. His back is shown with close-up of

the left flank lesion. The remainder of his physical examination is normal. Which of the following is the most likely cause (see Fig. 3-7A and B)?

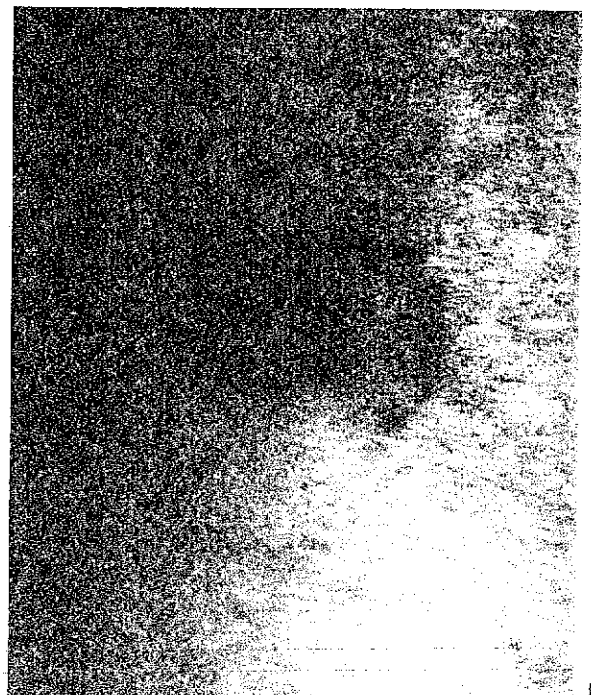
(A) Henoch-Schonlein purpura
(B) Idiopathic thrombocytopenic purpura (ITP)
(C) Lyme disease
(D) Child abuse
(E) Roseola

- 52 A 38-year-old woman presents to the ED complaining of throat irritation and a 3-week history of episodic spastic cough. The cough is worse at night and is occasionally so forceful that she vomits after she coughs. She is accompanied by her teenage son who has had a similar illness for 6 weeks without abating. She is a nonsmoker. What is the most likely cause of her illness?

(A) *Corynebacterium diphtheriae*
(B) *Legionella pneumophila*
(C) *Bordetella pertussis*
(D) *M. pneumoniae*
(E) *S. Pneumoniae*



A



B

Figure 3-7.

- 53 After postoperative adhesions, which of the following is the most common cause of this x-ray finding (see Fig. 3-8)?



Figure 3-8.

- (A) Incarcerated hernias
(B) Intussusception
(C) Neoplasms
(D) Volvulus
(E) Gallstone ileus
- 54 A 54-year-old man presents with chest pain of 4 hours' duration. He also complains of diaphoresis, shortness of breath, and orthopnea. Vital signs are

98.6, 60, 22, 97/60, 92% on RA. Physical examination demonstrates an S₃ and bilateral crackles to the midlung fields. The EKG is shown in Figure 3-9. Which of the following is the most appropriate definitive management?

- (A) Admit—immediate percutaneous transluminal coronary angioplasty.
(B) Admit—immediate fibrinolytic therapy.
(C) Admit—immediate upper endoscopy.
(D) Admit—immediate heparin, G2b3a inhibitor, and cardiac care unit (CCU) admission.
(E) Discharge home for outpatient stress test.

- 55 Which of the following is true regarding pemphigus vulgaris?

- (A) It is most common in children.
(B) Nikolsky's sign is infrequently present.
(C) Antibiotics are the most important part of management.
(D) Oral blisters that spontaneously rupture to form painful erosions are the earliest manifestation.
(E) Outbreaks are commonly triggered by sulfonamides or β -lactam drugs.

- 56 A term female neonate develops purulent ocular discharge on day 3 of life. Which of the following etiologies carries the greatest morbidity in this patient?

- (A) *C. trachomatis*
(B) *N. gonorrhoeae*
(C) *S. aureus*

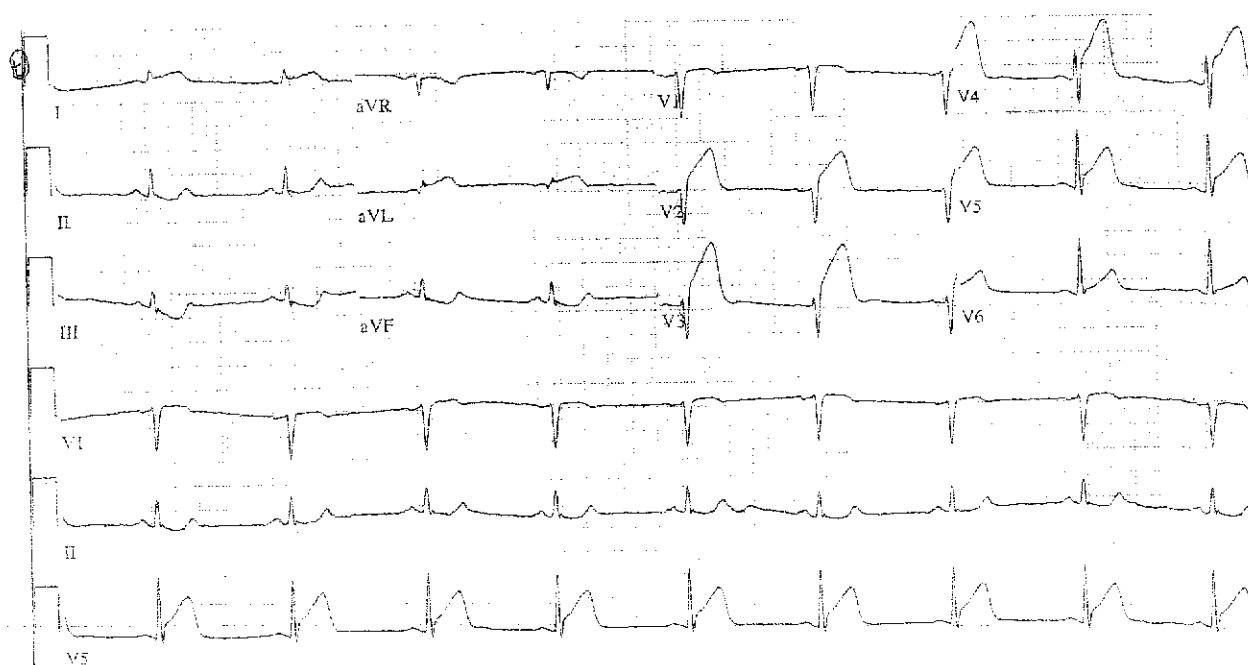


Figure 3-9.

- (D) No organism—allergic conjunctivitis
(E) No organism—chemical conjunctivitis
57. A 44-year-old alcoholic man presents with hematemesis. Which of the following is the most likely cause?
- (A) Peptic ulcer disease
 - (B) Gastric varices
 - (C) Esophageal varices
 - (D) Boerhaave's syndrome
 - (E) Arteriovenous malformation
58. A 65-year-old man presents with a syncopal event without prodromal symptoms. His vital signs are 98.6, 60, 18, 142/75, 99% RA. The EKG is shown in Figure 3-10. Which of the following is the most appropriate next step in management?
- (A) Discharge home with cardiology follow-up
 - (B) Cardioversion at 50 J
 - (C) Defibrillation at 200 J
 - (D) Amiodarone 150 mg IV
 - (E) Admission and pacemaker placement
59. Which of the following medications is safe to use on facial rashes?
- (A) Triamcinolone
 - (B) Fluocinonide
 - (C) Betamethasone
 - (D) Hydrocortisone
 - (E) All of the above
60. Which of the following is true regarding the role of ipratropium in asthma management?
- (A) The main benefit of ipratropium, instead of atropine or other anticholinergic drugs, is ipratropium has a more rapid onset of action.
 - (B) Ipratropium is useful as a sole bronchodilator in the treatment of acute asthma exacerbations.
 - (C) Ipratropium is most useful as an adjunct for patients with severe asthma exacerbations.
 - (D) Ipratropium has never been proved to be of benefit in patients with acute asthma exacerbations.
 - (E) None of the above.

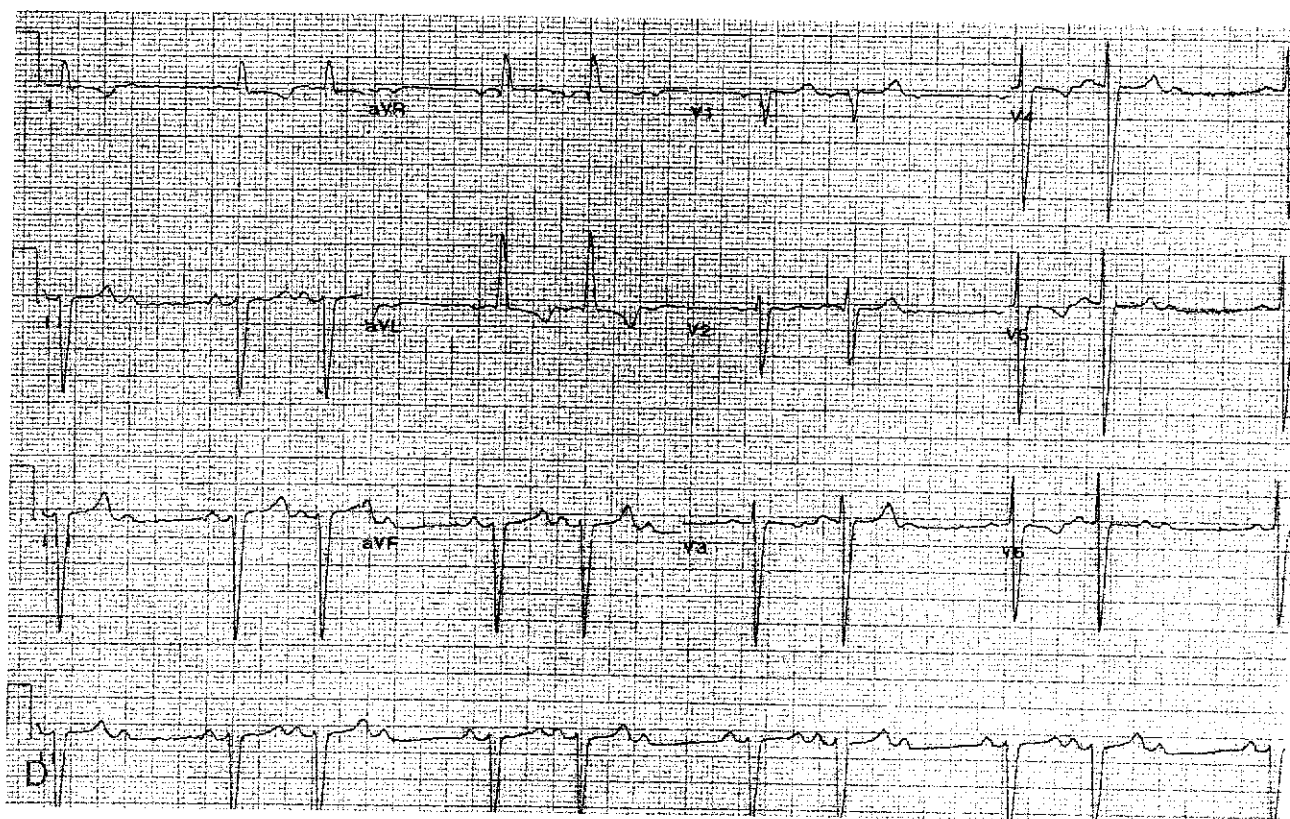


Figure 3-10.

- 61 The most common cause of distal symmetric polyneuropathy is
- (A) Amyotrophic lateral sclerosis.
 - (B) Guillain-Barré syndrome.
 - (C) Alcoholism.
 - (D) Diabetes mellitus.
 - (E) Paraneoplastic syndrome.
- 62 Which of the following is true of vitreous hemorrhage?
- (A) Symptoms progress from floaters to visual loss.
 - (B) The red reflex is enhanced.
 - (C) Sudden onset of unilateral pain is typical.
 - (D) Valsalva can be helpful in management.
 - (E) Treatment involves recumbent position.
- 63 Which of the following is the serum half-life of adenosine?
- (A) 1 second
 - (B) 10 seconds
 - (C) 1 minute
 - (D) 5 minutes
 - (E) 10 minutes
- 64 A 44-year-old man presents with painful, swollen gums that bleed easily, malaise, and intermittent fevers over the last week. He smokes, takes no medicines, and denies weight loss, night sweats, or family history of hematologic malignancy. Examination reveals poor dental hygiene, inflamed gingival tissue, and mild regional lymphadenopathy. Which of the following is true regarding this patient?
- (A) Analgesics alone are sufficient for therapy.
 - (B) Spirochetes and fusobacteria are commonly present in gingival creases.
 - (C) Follow-up with a dentist is generally not necessary.
 - (D) Vincent's angina, a common complication, involves extension to the buccal mucosa.
 - (E) The disease is communicable by direct contact with secretions.
- 65 Which of the following is true regarding perforated peptic ulcers?
- (A) Cocaine use is a risk factor for perforation.
 - (B) Patients may develop paradoxical improvement of their pain without treatment.
 - (C) Evidence of intraperitoneal free air on an upright abdominal film or chest x-ray is only present 70% of the time.
 - (D) Regardless of patient symptoms, a rigid abdominal wall on physical examination is a nearly constant finding.
 - (E) All of the above.
- 66 A 57-year-old woman is found to have bilateral popliteal artery aneurysms. Which of the following conditions is she at most risk of developing?
- (A) Alzheimer's disease
 - (B) Cystic fibrosis
 - (C) Hepatic failure
 - (D) Endocarditis
 - (E) Abdominal aortic aneurysm (AAA)
- 67 A 25-year-old man with schizophrenia presents with acute agitation. According to a family member who is present, he was seen by a psychiatrist during the previous week and diagnosed with schizophrenia. He is extremely agitated, tachycardic, diaphoretic, febrile, and exhibits muscle rigidity. Which of the following is the most appropriate next step in management?
- (A) Acetaminophen
 - (B) Lorazepam
 - (C) Amantadine
 - (D) Bromocriptine
 - (E) Haloperidol
- 68 Which of the following is a risk factor for completed suicide?
- (A) Women younger than 50 years
 - (B) Antisocial personality disorder
 - (C) Family history of suicide
 - (D) Generalized anxiety disorder
 - (E) Arachnophobia
- 69 A 3-year-old girl presents with right elbow pain after being pulled by the hand by her mother. There is no history of trauma. She has minimal tenderness of the elbow, but refuses to use her right upper extremity. Which of the following is the most appropriate next step in management?
- (A) Elbow x-rays
 - (B) Wrist x-rays
 - (C) Flexion and hyperpronation of the forearm
 - (D) Extension and hyperpronation of the forearm
 - (E) Extension and supination of the forearm
- 70 A 55-year-old man presents with a "bump" on his upper eyelid. The eyelid is shown in Figure 3-11. Which of the following is the most appropriate next step in management?
- (A) Intravenous antibiotics
 - (B) Eyelid culture
 - (C) Warm compresses
 - (D) Needle aspiration of the raised area
 - (E) Topical antivirals

- 87 The best means of rewarming a frozen or partially thawed extremity is
- (A) Direct tissue massage.
 - (B) Direct exposure to dry heat sources such as heat lamps or open fires.
 - (C) Immersion in a water bath maintained between 40°C and 42°C.
 - (D) Slow thaw through immersion in an ice water bath.
 - (E) Forced-air warming device (convection method, e.g., Bair Hugger).
- 88 A 25-year-old man ingests an unknown quantity of iron tablets 2 hours before presentation in an overdose attempt. Which of the following is the most appropriate next step in management?
- (A) Activated charcoal
 - (B) Gastric lavage
 - (C) Ipecac
 - (D) Polyethylene glycol
 - (E) Hemodialysis
- 89 A 6-year-old boy is brought by a distraught mother who thinks her son had a stroke. She notes that he had a fever and was complaining of right ear pain 1 day before. The fever was controlled with acetaminophen and the patient's pain improved, but recurred the day of presentation. The patient denies any headache or neck stiffness. On examination, he is febrile to 101°F, well appearing, has a bulging right tympanic membrane (TM) with poor mobility, and the entire right side of his face is paralyzed. There is no rash present. What is the most appropriate management plan?
- (A) Oral antibiotics and follow-up with PCP
 - (B) IV antibiotics and admission to hospital for myringotomy
 - (C) IV steroids and acyclovir
 - (D) CT brain and neurosurgery consultation
 - (E) Lumbar punctures, IV steroids, and IV antibiotics
- 90 A 35-year-old patient is sent to the emergency room (ER) for evaluation of a heart murmur. The murmur is diastolic, rumbling, and loudest at the apex. Which of the following is the most common etiology of the murmur?
- (A) Pulmonary embolism
 - (B) MI
 - (C) Rheumatic heart disease
 - (D) Atrial myxoma
 - (E) Aortic dissection
- 91 Which of the following may worsen acute renal failure due to rhabdomyolysis?
- (A) Mannitol
 - (B) Saline
 - (C) Bicarbonate
 - (D) Furosemide
 - (E) Deferoxamine
- 92 A 45-year-old woman is referred to the ED from an optometrist with a diagnosis of bilateral papilledema and "rule out pseudotumor cerebri." Which of the following is true about pseudotumor cerebri (also known as *idiopathic intracranial hypertension*)?
- (A) Blurry vision is the most common presenting complaint.
 - (B) CT scanning will demonstrate hydrocephalus in 80% of cases.
 - (C) Oculomotor nerve palsy is the most common associated cranial nerve palsy.
 - (D) Men outnumber women 4:1.
 - (E) Headaches associated with the disorder are usually worse in the recumbent position.
- 93 Which of the following is the treatment of choice for acute cluster headache?
- (A) 100% oxygen
 - (B) Sumatriptan
 - (C) Morphine
 - (D) Lorazepam
 - (E) Dexamethasone
- 94 Which of the following is best able to diagnose penetrating esophageal injuries?
- (A) Bronchoscopy
 - (B) Esophagoscopy
 - (C) Esophagogram
 - (D) Esophagoscopy and esophagogram
 - (E) CT chest
- 95 A 10-year-old boy presents with elbow pain after falling off the bed. Radiographic visualization of which of the following usually indicates an occult elbow fracture?
- (A) Anterior fat pad
 - (B) Posterior fat pad
 - (C) Baumann's angle of 75 degrees
 - (D) Bilaterally equal Baumann's angles
 - (E) Anterior humeral line bisecting the capitellum
- 96 Diverticular disease ...
- (A) Is more common in the right colon among Japanese-Americans.
 - (B) Most commonly affects the sigmoid colon in the Western world.
 - (C) Is treated with a high-fiber diet.

- (D) Is best diagnosed with a barium enema.
- (E) Is all of the above.

97 Which of the following symptoms, associated with chest pain, has the highest predictive value for coronary ischemia?

- (A) Dyspnea
- (B) Nausea
- (C) Back pain
- (D) Diaphoresis
- (E) Fever

98 A 61-year-old male smoker recently performed some repairs on several air conditioning units during the late summer. He is now brought in by his family confused, with high fevers, chills, a dry cough, and diarrhea. The test that will best determine the likely specific cause of his illness is which of the following?

- (A) Urine antigen testing
- (B) Blood cultures
- (C) Sputum cultures
- (D) Chest x-ray
- (E) Serology testing

99 Which of the following is true regarding diverticulitis?

- (A) The recurrence rate of diverticulitis after a single, uncomplicated episode is 75%.
- (B) Diverticulitis is the most common cause of a colovesical fistula.
- (C) All patients younger than 40 years with diverticulitis should have resection of the disease segment of colon.
- (D) Barium-soluble contrast enema is the radiographic study of choice in the ED.
- (E) The mortality rate of hospitalized patients with acute diverticulitis is 35%.

100 Which of the following statements is true regarding general management of poisoned patients?

- (A) Addressing circulatory insufficiency should precede airway management in most cases.
- (B) Specific antidotes are indicated for most poisoning.
- (C) Recognition of common toxidromes is helpful to direct therapy.
- (D) Ipecac is now the mainstay of gastrointestinal decontamination therapy.
- (E) Standard hospital urine toxicologic screens detect the most common toxins.

Answers and Explanations

1 Answer B. All of the above choices are complications of otitis media, but hearing loss is the most common. The primary reason for antibiotic treatment of otitis media is the prevention of these complications. Current treatment guidelines by the American Academy of Pediatrics involve both immediate antibiotic therapy as well as deferment of therapy with watchful waiting for 48 hours to observe for development of complications.

2 Answer D. "Walking pneumonia" most frequently refers to "atypical" pneumonia, a term which has been used to distinguish infections caused by *M. pneumoniae*, *C. pneumoniae* and *Legionella*, from infections caused by "classic" bacteria such as *S. pneumoniae*. The term *walking pneumonia* came about because patients with this entity are usually well enough to be out of bed and able to perform their normal activities without difficulty. The course tends to be mild although it may be prolonged. Several recent studies have demonstrated that it is not possible to differentiate between typical and atypical causes of pneumonia based on symptoms or chest radiography. Furthermore, chest x-rays may appear normal in either typical or atypical cases. However, because *Mycoplasma* and *Chlamydia* are the most common causes of community-acquired pneumonia in this patient's age-group (5 to 15 years), and because he lacks signs and symptoms suggesting a critical illness, it is reasonable to treat him empirically for "atypical" community-acquired pneumonia. Macrolides are the antibiotics of choice for *Mycoplasma* and *Chlamydia*.

3 Answer C. The EKG demonstrates atrial fibrillation with rapid ventricular response. The most likely cause in this young adult with no medical history except for alcohol abuse is "holiday heart syndrome," which can occur within 2 days of an alcohol binge. It often resolves spontaneously, but may require rate control therapy and possibly anticoagulation. In the absence of cocaine use, MI would be extremely unlikely in an otherwise healthy 22-year-old. Pulmonary embolism is an important cause of atrial fibrillation, but is not likely in the absence of chest pain, dyspnea, or risk factors. The physical examination is unremarkable, so hypertension is unlikely. Diabetes does not confer an increased risk of atrial fibrillation.

4 Answer C. Acute arsenic poisoning affects multiple organs, including the liver, kidneys, lungs, and heart. It replaces phosphate in high-energy adenosine triphosphate (ATP) bonds and decreases energy production. Management is supportive plus chelation therapy. The first-line therapy for chelation is dimercaprol (or British antilewisite [BAL]). Activated charcoal does not absorb arsenic or heavy metals. Ipecac is almost never indicated for any poisoning. Penicillamine is a less effective alternative to dimercaprol, and is only used when the latter's gastrointestinal side effects are prohibitive. Deferal is used for chelation of iron.

5 Answer B. The CT scan shows a right-sided epidural hematoma. While the patient is initially awake and alert, this may be indicative of the lucid interval that is often seen in patients with epidural hematomas (although it is neither sensitive nor specific for the diagnosis). Acute worsening of the clinical status mandates returning to the ABCs of trauma evaluation. Although burr hole placement is the most important definitive management, control of the airway is the most important initial action. Diagnostic peritoneal lavage (DPL) may be performed if the patient is hypotensive and intraperitoneal source is expected, but in solitary head trauma, this is unlikely to be the case. Thoracotomy is indicated in patients with penetrating trauma to the chest who arrest in the ED or shortly beforehand. Nasogastric tube placement is contraindicated in patients with severe head and facial trauma as damage to the inferior portion of the skull may allow the tube to pass from the nose into the cranium. (Figure courtesy of Robert Hendrickson, MD. Reprinted from Hendrickson & Greenberg's *text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:51, with permission.)

6 Answer B. Of the primary headache syndromes, cluster headaches have the most consistent presentation. The average age of onset is 28 to 30 years. They are strictly unilateral headaches that occur in the ophthalmic division (V1) of the trigeminal nerve. Therefore, the pain is most commonly maximal in the retro-orbital and temporal region, although patients may experience radiating pain to the forehead, temple, cheek, and jaw. The pain is severe and is often described as "boring" or "tearing" in nature. Patients are often very restless or agitated.

during cluster headaches and characteristically rock or pace back and forth. The headaches last on average from 45 to 90 minutes and occur one to three times daily. The typical cluster period (during which headaches occur) lasts 6 to 12 weeks with typical remissions lasting 12 months. Traditionally, they have been much more common in men, although recent epidemiologic studies have revealed a declining predominance of men. In addition, patients affected by cluster headaches more frequently indulge in cigarette smoking and alcohol abuse. Interestingly, once a cluster period begins, alcohol usually triggers an attack within minutes. There is also a seasonal pattern to the clusters, with exacerbations occurring more often in the spring and fall. Interestingly, however, attacks occur most commonly in the 2 weeks after the summer and winter solstices.

7 Answer D. TMJ dislocations are anterior dislocations that may result after trauma or after widely opening the mouth as in yawning, laughing or singing. The mandibular condyle slides anteriorly during normal mouth opening. Occasionally the mandibular condyle may slide anterior to the articular eminence of the temporal bone resulting in an anterior dislocation. Subsequent muscle spasm prevents spontaneous reduction and the patient presents to the ED with a fixed, protruding and widely open mouth. The patient may not be able to handle the secretions and may therefore be drooling. Posterior and lateral dislocations can occur but they almost always occur in the setting of trauma. Most spontaneous dislocations are bilateral. When unilateral dislocations occur, the jaw is rotated toward the unaffected side. Reduction is achieved by applying downward pressure on the most posterior molars followed by slight posterior pressure. Gauze should be thickly wrapped around the physician's thumbs to prevent injury from the typical bite that occurs upon reduction.

8 Answer A. Delayed presentation of neurologic deficits is characteristic of vascular injuries to the neck due to blunt trauma. Only 10% of patients who ultimately develop neurologic deficits due to vascular injury exhibit signs and symptoms of injury within the first hour. Most patients experience stroke symptoms such as hemiparesis, hemiplegia, or aphasia between 1 and 24 hours after injury due to carotid artery dissection or thrombosis. Furthermore, a significant percentage of patients will not develop symptoms until after 24 hours has passed. Vertebral artery injury can also occur, although it is less common. Because the vertebral arteries combine to form a single basilar artery, injuries to the vertebral artery do not produce lateralizing symptoms. Patients may present with nausea, vomiting, central vertigo,

and visual changes. Esophageal injuries are relatively uncommon, frequently subtle, and often missed in the setting of neck trauma. Because barium may provoke an inflammatory mediastinitis, patients with suspected esophageal injury should first receive an examination with water-soluble contrast such as gastrografin. If the initial study is negative, a follow-up examination with barium can be performed because of its superior sensitivity for smaller defects. Zone II injuries are most amenable to surgical repair due to relatively uncomplicated surgical exposure and vascular control. Neck wounds should never be probed outside the operating room. If careful examination fails to determine platysma integrity, a surgeon should be consulted for presumed violation of the platysma. Impaled objects should always be left in place because they may tamponade vascular injuries. They should only be removed in the operating room under direct visualization.

9 Answer D. Bilével positive airway pressure (BiPAP) ventilation emulates pressure support mechanical ventilation with positive end-expiratory pressure (PEEP) in which the machine cycles between two different pressure levels during inspiration and expiration. This is in contrast to continuous positive airway pressure (CPAP) in which the pressure is the same throughout inspiration and expiration (i.e., IPAP = EPAP). When a patient's oxygenation status is not improving, the two main adjustments that can be made are to increase the inspired FIO_2 and to increase the PEEP. With BiPAP, there is a limit to the amount of oxygen that can be applied because the oxygen is not being delivered to the lower airways, as is the case with mechanical ventilation. However, the EPAP (i.e., PEEP) can be increased in order to recruit additional alveoli (by stenting them open with increased pressure at the end of expiration), which increases the surface area for gas exchange and hopefully results in improved oxygenation. In order to maintain the positive pressure differential (PPD) during inspiration, the IPAP may be concomitantly increased (to ensure ongoing adequate ventilation). If these measures fail, the patient requires intubation and mechanical ventilation.

10 Answer A. The patient has a Colles's fracture, which puts him at risk for median nerve injury. Injury to this nerve can result from either the fracture itself or during therapeutic reduction. Fall on outstretched hand is the most common mechanism for a Colles's fracture. A volarly displaced distal radius fracture, referred to as a reverse Colles's or Smith's fracture, which usually results from trauma to the dorsum of the hand. Smith's fracture also involves the median nerve more often than other peripheral nerves of the

upper extremity. An intra-articular fracture of the distal radius with displacement of the carpal bones is referred to as a Barton's fracture.

11 Answer E. The CT reveals the classic "teardrop" sign associated with an orbital floor fracture. Direct trauma to the orbit causes an immediate rise in intraorbital pressure fracturing the weakest borders of the orbit. This most commonly results fractures of the orbital floor fracture and medial orbital wall. Owing to swelling and stretching of the infraorbital nerve, there is often transient hypoesthesia in its distribution lasting for 1 to 2 weeks. In addition, the inferior rectus muscle may become entrapped in the orbital floor defect; effectively tethering the globe such that upward gaze is limited or not possible. Patients may complain of diplopia if partial upward gaze is possible. Enophthalmos results from loss of orbital volume and supporting structures. It may not be visible acutely because of the swelling associated with the injury. However, delayed repair is required if it is present 2 weeks after the injury. Periorbital emphysema results from communication of the orbit with the sinus, an air-filled structure. It is important to note that exophthalmos resulting from a retro-orbital hematoma can also occur. This is a true emergency that may require immediate lateral canthotomy. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:70.)

12 Answer C. Patients with Rocky Mountain spotted fever (RMSF) typically develop a maculopapular rash on the wrists and ankles 4 days after being bitten by an American dog tick (*Dermacentor variabilis*) or Rocky Mountain wood tick (*Dermacentor andersoni*) infected with *Rickettsia rickettsii*. Despite its name, North Carolina and Oklahoma account for more than one third of RMSF cases. Wyoming and Montana are the only Rocky Mountain states that have an appreciable number of RMSF cases. Once formed, the rash rapidly spreads centrally to the trunk and extremities and becomes petechial and purpuric although up to 15% of patients do not develop a rash. Other common findings include a high fever (typically $>102^{\circ}\text{F}$), myalgias (particularly of the gastrocnemius), headache, vomiting, and malaise. Doxycycline is the treatment of choice in all patients except for pregnant women, who should receive chloramphenicol (CAM). Antibiotics should never be withheld while awaiting confirmation of the disease, as the case fatality rate in untreated cases is very high (vs. 3% in treated cases). Diagnosis is primarily clinical, as the peripheral WBC count is usually normal, and serologic studies are not useful until convalescence. The Weil-Felix test has

poor sensitivity and specificity and has therefore been abandoned. There is no known human to human spread so prophylactic treatment of contacts is unnecessary.

13 Answer A. Temporal arteritis (or giant cell arteritis) is a large vessel vasculitis that primarily affects branches of the carotid artery. The disease is rare before the age of 50, and incidence peaks in the seventh decade. The most sensitive finding is a new headache, whereas the most specific finding is jaw claudication. However, the disease often presents vaguely with systemic symptoms such as a fever of unknown origin, fatigue, malaise, and anorexia. The diagnosis should be considered in any older person with fever of unknown origin. Scalp pain is a more specific finding than headache, particularly when localized over the temporal artery. Vertigo is not a manifestation of the disease. Permanent visual loss occurs in only 15% of patients and is usually preceded by the development of blurring, diplopia, or amaurosis fugax. Corticosteroids are the treatment of choice and should never be withheld if the diagnosis is seriously considered. Multiple studies have demonstrated that treatment with steroids does not affect the accuracy of biopsy if performed within a few weeks.

14 Answer B. This patient is infected with *Giardia lamblia*, the most common enteric parasite infection worldwide. It is most commonly acquired through drinking contaminated water. However, foodborne and person-to-person transmission also occur. Backpackers frequently contract the illness after drinking inadequately treated or untreated stream water that is contaminated by animal or human fecal matter. The diarrheal illness is therefore often known as *backpacker's diarrhea*. Giardiasis is a noninflammatory, noninvasive diarrhea, so leukocytes are not seen in stool samples. Instead, diagnosis relies on the detection of trophozoites or cysts ("ova and parasites") in stool specimens. Detection of ova and parasites varies from 60% to 80% after a single stool to greater than 90% after three stools. However, when the clinical history is consistent with Giardiasis, a diagnosis can be made presumptively. To prevent chronic infection as well as person-to-person transmission, both symptomatic and asymptomatic patients should be treated. The treatment of choice is metronidazole 250 mg t.i.d. for 7 days and is generally well tolerated.

15 Answer C. Altered mental status, oculomotor dysfunction, and ataxia comprise the clinical triad of Wernicke's encephalopathy. Alcoholics develop this emergent condition due partly to thiamine deficiency and supplementation remains the mainstay of

management. Wernicke's encephalopathy may deteriorate into Wernicke-Korsakoff syndrome, which adds the elements of memory disturbance and confabulation. Magnesium therapy, glucose, and intravenous fluids are important adjunctive therapies for these disorders. Lorazepam is used to treat alcohol withdrawal seizures but has no role in the management of Wernicke's encephalopathy. Haloperidol may be used to treat agitation and psychosis in alcohol withdrawal. Pyridoxine therapy may be used as part of a multivitamin that contains thiamine, but is not essential to treat Wernicke's encephalopathy. Potassium repletion may be indicated if hypokalemia is present or expected during the course of therapy.

- 16** Answer A. RSV is the most commonly isolated virus in patients with signs and symptoms of acute otitis media. Influenza is a distant second, and the other choices are uncommon. It is unclear whether viruses directly cause pathology or if they simply predispose to bacterial invasion of the middle ear. The most common bacterial causes of acute otitis media are *S. pneumoniae*, *M. catarrhalis*, *H. influenzae*, and *S. pyogenes*.
- 17** Answer E. This patient has complete airway obstruction due to foreign body aspiration. The classic triad of foreign body aspiration is coughing, wheezing, and decreased or absent breath sounds. However, approximately 40% of patients may have no significant physical examination findings. Although this patient initially had partial foreign body obstruction, it progressed to complete obstruction and she now requires a definitive airway. Back blows and chest thrusts would be reasonable initial approaches in infants with foreign body aspiration. Abdominal thrusts can be used in children older than 12 months, although the Heimlich maneuver is the initial procedure of choice for older children and adults. Blind finger sweeps, which were advocated in the past, should be discouraged. As in this case, blind finger sweeps have the potential of converting a partial airway obstruction to complete airway obstruction. In the setting of complete airway obstruction, a definitive airway must be established. The fastest way to accomplish this in this case is by performing a cricothyroidotomy. A needle cricothyroidotomy instead of a surgical cricothyroidotomy should be performed in children younger than 8 years. Surgical cricothyroidotomy is difficult to perform in a small child because of the small size of the cricothyroid membrane, and it places children at risk for subsequent subglottic stenosis. A needle cricothyroidotomy is performed using a 12- to 16-gauge angiocatheter and inserting it through the inferior portion of the cricothyroid membrane into

the trachea. The catheter can then be attached to an adapter from a size No. 3.0 endotracheal tube to allow for bag ventilation, or to high flow oxygen tubing for percutaneous transtracheal jet ventilation. In either case, these measures are only temporary until a more definitive airway can be established.

- 18** Answer A. Ipsilateral pleuritic chest pain and dyspnea are the most common symptoms of a primary spontaneous pneumothorax. Hemoptysis is uncommon in spontaneous pneumothorax and would signify a specific etiology for the pneumothorax such as tumor. Patients may occasionally be asymptomatic or have nonspecific complaints. Many patients delay treatment for up to 1 week, and symptoms tend to resolve without treatment in 24 to 48 hours. Primary spontaneous pneumothorax is three times more common in men than in women, and typically occurs in tall, healthy young men. Other factors associated with spontaneous pneumothorax are smoking, changes in atmospheric pressure, mitral valve prolapse and Marfan's syndrome. The most common arrhythmia is a mild sinus tachycardia.
- 19** Answer D. Hirschsprung's disease accounts for roughly 20% of cases of partial intestinal obstruction in early infancy. Although intussusception is the most common cause of intestinal obstruction in children younger than 2 years old, the typical presentation is one of acute-onset, severe abdominal pain which may be associated with vomiting and bloody stools. Patients with pyloric stenosis present with progressive nonbilious projectile emesis. Patients with GERD do not develop signs of obstruction and most commonly have nonbilious emesis. Hirschsprung's disease is usually diagnosed in the newborn nursery due to failure of newborns to pass meconium. Ninety-nine percent of full-term infants pass meconium within 48 hours of birth. However, because there is a spectrum of disease, some infants may present in a delayed manner and may have a subtle presentation. The absence of stool in the rectal vault in concert with signs and symptoms of obstruction should bring about consideration of Hirschsprung's disease. Diagnosis is first suspected through an abnormal "string sign" on barium enema. This is followed by rectal biopsy revealing the aganglionic segment of bowel responsible for the disease.
- 20** Answer A. Of all the choices, acute angle closure glaucoma is most likely to cause painful loss of vision. All the other choices are much more likely to cause painless (rather than painful) loss of vision.
- 21** Answer D. Phenytoin and lidocaine are class IB antidysrhythmic agents. Class I agents have their

primary effects on fast sodium channels and slow down-action potential depolarization and conduction. These effects are greatest in class IC agents (flecainide, propafenone), moderate in class IA agents (procainamide, quinidine), and least in class IB agents. Unlike classes IA and IC, class IB agents shorten repolarization time and action potential duration. Phenytoin is not used in the ED as an antidysrhythmic, but may cause important cardiac conduction abnormalities in patients who take the drug for its antiepileptic effects. Loading phenytoin intravenously can occur at a rate no greater than 50 mg per minute, as its diluent, propylene glycol, can cause dysrhythmias or hypotension when given too quickly. Fosphenytoin lacks this diluent and may be given more quickly.

Answer B. Patients with multiple myeloma are at risk for hyperviscosity syndrome, which is characterized by extremely high levels of pathologic proteins in the blood, causing increased viscosity and vascular sludging. Micro-infarctions are common, especially in cerebral and ocular vessels. The triad of vision problems, neurologic symptoms, and mucosal bleeding in a patient with multiple myeloma or Waldenstrom's macroglobulinemia strongly suggests the presence of hyperviscosity syndrome. Laboratory data, although helpful, often returns with errors as most standard equipment may be unable to analyze the blood because of the elevated protein levels. Definitive treatment involves plasmapheresis. In patients with severely altered mental status, simple phlebotomy and saline replacement may rapidly improve the clinical condition. Hemodialysis is not used in dysproteinemias. Colloids such as platelets and packed RBC transfusions will likely exacerbate the viscosity. Erythropoietin has no role in the management of most acute conditions.

Answer C. Aneurysms > 5 cm in size are at greatest risk of rupture, although smaller aneurysms may also rupture. Debate exists as to the optimal time of elective repair of asymptomatic aneurysms, but patients presenting to the ED with symptomatic aneurysms should always be aggressively evaluated.

Answer B. The patient has erythema nodosum (EN), which is thought to be a hypersensitivity reaction to a number of different antigens. It most commonly occurs in women (female:male ratio of 5:1) during the third decade but it frequently occurs in children as well. Patients often experience a vague prodrome of fever, malaise, and arthralgias, followed by the development of painful oval erythematous nodules typically over the shins. Individual lesions are not pruritic and are usually self-limited, lasting

approximately 2 weeks, although new lesions may continue to appear such that the entire illness lasts up to 6 weeks. The most common cause is streptococcal infection in children and streptococcal infection and sarcoidosis in adults. Other causes include tuberculosis (TB), coccidioidomycosis, *Yersinia* or *Chlamydia* infection, inflammatory bowel disease, Hodgkin's lymphoma, pregnancy, and drugs including oral contraceptives and sulfonamides. The lesions usually respond to high-dose aspirin (650 mg every 4 hours) or NSAIDs (e.g., naproxen or indomethacin) and bed rest. Occasionally, patients are treated with supersaturated potassium iodide (mechanism is uncertain). Corticosteroids are effective but are rarely used and may worsen the underlying infection if one is present. (Figure © David Efron, MD, 2004. Used with permission.)

Answer B. This patient is suffering from thyroid storm. There are no specific criteria for establishing the diagnosis of thyroid storm, although scoring systems have been developed to aid in its diagnosis. However, the diagnosis of thyroid storm remains a clinical one, as laboratory abnormalities in thyroid storm are no different than in patients with hyperthyroidism. The clinical manifestations of thyroid storm include fever, tachycardia, and systolic hypertension with a widened pulse pressure, tremor (especially in the hands) as well as dysfunction of the central nervous system (CNS) and gastrointestinal (GI) disturbances. CNS disturbances range from agitation, restlessness and psychosis, to confusion and coma. GI manifestations include vomiting and diarrhea (e.g., hyperdefecation). Most cases of thyroid storm are associated with Grave's disease and occur after a precipitating event such as lithium withdrawal. Lithium inhibits thyroid hormone release from the thyroid gland so abrupt withdrawal may lead to a rapid rise in free thyroid hormone levels. Although lithium can be used for the treatment of thyroid storm, thioamides such as propylthiouracil (PTU) and methimazole (MMI) are first-line agents as they prevent the production, secretion and peripheral conversion (in the case of PTU) of thyroid hormone. Lugol's solution or other iodine preparations should not be used until at least 1 hour after thioamides are administered. When iodide preparations are given before PTU or MMI, the intrathyroidal increase in iodine results in increased thyroid hormone synthesis and release. Aspirin should never be given to patients in thyroid storm because it prevents thyroid hormone from binding to carrier proteins, resulting in an increase in free thyroid hormone levels. Dantrolene is a muscle relaxant that may be useful in neuroleptic malignant syndrome, serotonin syndrome, or malignant hyperthermia. Propranolol is the first-line

agent in thyroid storm. It effectively combats the peripheral adrenergic effects in thyroid storm and rapidly improves the clinical scenario.

26 Answer B. The patient has staphylococcal scalded skin syndrome (SSSS), also known as *Ritter's disease*. The disease is caused by an epidermolytic toxin expressed by *S. aureus*, phage group II, and typically occurs in otherwise healthy children. Infection typically begins as an innocuous infection of the pharynx or conjunctiva until a diffuse erythroderma develops that has a sandpaper-like feel, resembling scarlet fever. The skin ultimately wrinkles, develops transient blisters and then peels in large sheets revealing glossy, moist red skin underneath. Treatment is directed at *S. aureus*, and nafcillin is the best choice. (Figure courtesy of Gary Marshall, MD. Reprinted in Chung EK. *Visual diagnosis in pediatrics*. Lippincott Williams & Wilkins; 2006.)

27 Answer A. The pain of duodenal ulcers is usually described as a burning or gnawing epigastric sensation that is decreased with food or antacids. The pain typically occurs 2 to 3 hours after a meal. Classically, two thirds of patients with duodenal ulcers describe pain that wakes them from sleep in the middle of the night, although few patients have pain on waking in the morning. The pain of gastric ulcers tends to occur more quickly after meals and may even be precipitated by food in some patients. Therefore, anorexia and weight loss occur in approximately 50% of patients with gastric ulcers, but rarely occur in patients with duodenal ulcers. Duodenal ulcers are twice as likely to be complicated by bleeding as gastric ulcers. *H. pylori*, although more commonly found in the setting of duodenal ulcers, is the major risk factor for the development of either type of ulcer. Flexible endoscopy is the diagnostic study of choice for peptic ulcer disease. Finally, only 15% to 20% of patients colonized with *H. pylori* will develop a peptic ulcer in their lifetime.

28 Answer A. The thin orbital floor is the most easily damaged part of the orbit in trauma. Globe injuries occur in one fourth of patients with orbital floor fractures. The teardrop sign seen on plain radiographs or CT scan is soft tissue that extends inferiorly from the orbital floor into the maxillary sinus, indicating a floor fracture. Antibiotics are often given in patients with orbital wall fractures, but are recommended only if the fracture extends through an infected sinus. Patients with orbital wall fractures should be instructed not to blow their nose, as it may worsen the degree of herniation of globe contents into the sinuses. Nasal congestion should be treated with a 3-day course of nasal decongestants.

29 Answer B. The patient likely has toxic shock syndrome (TSS), given the preceding skin infection, sunburn-like diffuse rash, hypotension, and fever. TSS is a toxin-mediated disease, either due to staphylococcal TSS toxin-1 or *Streptococcus pyogenes* exotoxins A and B. Staphylococcal TSS used to occur secondary to superabsorbent tampons in menstruating women, but now, like streptococcal TSS, is largely because of systemic and postsurgical infections. Multiorgan failure is characteristic of both processes. Blood cultures are usually negative in staphylococcal TSS and positive in approximately half of the cases of streptococcal TSS. Mortality for staphylococcal and streptococcal TSS is 5% and 30%, respectively. Management involves removal of any foreign bodies, antibiotics directed at streptococci and staphylococci, vasopressors, intravenous fluids, and intensive care monitoring.

30 Answer E. Rotavirus is an RNA virus which causes a secretory diarrhea in young children, most often in winter months. The peak age range is between 6 months and 2 years. Adults may get infected, but are generally asymptomatic. Symptoms include nausea, vomiting, fever, and severe watery diarrhea. The duration of symptoms is generally <2 weeks. Rotavirus does not cause an inflammatory gastroenteritis, so fecal leukocytes and erythrocytes are usually absent. Treatment involves intravenous hydration and supportive care. Antidiarrheals and antibiotics are not indicated. Patients may require admission for rehydration—stool studies should be sent for rotavirus culture and the patient should be contact isolated to help reduce spread of infection to other patients.

31 Answer A. HSV-2 is the most common cause of ulcerative vulvar and vaginal lesions, as approximately one in five sexually active adults is infected with the virus. Because it is sexually transmitted, the presence of HSV-2 in a pediatric patient should trigger a meticulous search for other signs of abuse. Patients typically develop multiple scattered lesions in varying types and stages, including vesicles, pustules, and ulcers. The lesions tend to be shallow and painful and frequently coalesce into larger lesions, particularly in women. Primary infections tend to be more severe than recurrent infections and are frequently associated with systemic symptoms, including fever, generalized malaise, headache and fatigue. Syphilis is initially characterized by a painless chancre, which disappears without treatment. Chancroid is an uncommon infection in the United States and is characterized by multiple genital ulcerations associated with a tender inguinal lymphadenitis called

a *bubo*. The lymphadenopathy is typically unilateral and occurs in 50% of patients. Lymphogranuloma venereum (LGV) is also a rare disease in the United States and is characterized by a painless, and often overlooked primary genital lesion. Patients typically present during the second stage of illness, with a tender unilateral lymphadenopathy that may involve the inguinal lymph nodes both above and below the inguinal ligament resulting in a noticeable groove in between ("groove sign"). Granuloma inguinale is another rare disease in the United States characterized by chronic, painless genital ulcerations. (Figure courtesy of Allan R. DeJong, MD. Reprinted in Chung EK. *Visual diagnosis in pediatrics*. Lippincott Williams & Wilkins; 2006.)

32 Answer A. Methanol is metabolized to formaldehyde by alcohol dehydrogenase, and formaldehyde is converted to formic acid by aldehyde dehydrogenase. Formic acid accumulates preferentially in the ocular tissues and the brain, most commonly the basal ganglia. Long-term morbidity of methanol overdose includes blindness and a parkinsonian syndrome, with bradykinesia and rigidity. Treatment of methanol and ethylene glycol overdoses involves correction of the metabolic acidosis with sodium bicarbonate, inhibition of alcohol dehydrogenase with fomepizole or ethanol, and dialysis of the toxic alcohol.

33 Answer C. Idiopathic thrombocytopenic purpura (ITP) causes immune-mediated destruction of platelets. Acute ITP is more often seen in children and chronic ITP is seen in adults. Bleeding is the most common clinical finding and intracranial bleeding is the most common cause of death. Treatment in children is primarily supportive with a high rate of spontaneous resolution. Mortality in young adults and children is below 5%; in older adults, it jumps to almost 50% because of complications surrounding intracranial hemorrhage. Aspirin is contraindicated because of its irreversible platelet-killing effects. There is a female predominance in adult patients. Platelets are not indicated until levels reach $<10,000$ to $20,000$ cells per mm^3 . Treatment in adults is with high-dose corticosteroids and/or IVIG.

34 Answer A. Owing to their significant airflow obstruction, mechanically ventilated asthmatics are at risk for lung hyperinflation and concomitantly elevated airway pressures. To avoid these problems, the most commonly used ventilatory strategy is "permissive hypercapnia." In this strategy, the patient is ventilated at settings that ensure adequate time for exhalation, which limits air trapping, and subsequent auto-PEEP and lung hyperinflation (with elevated plateau pressures). Expiratory time can be

maximized by limiting the time spent during inspiration (by setting high inspiratory flow rates between 70 and 100 L per second and by using a square-wave form), as well as by decreasing minute ventilation (by decreasing either V_T or RR). The byproduct of these changes is hypercapnia. Previous approaches aimed to normalize alveolar CO_2 by using higher respiratory rates and tidal volumes but resulted in increased morbidity and mortality from airway barotrauma. Peak pressure reflects the pressure applied to the large- and medium-sized airways as air is pushed into the lungs by the ventilator. It strongly reflects airway resistance and tends to be very high in asthmatics due to their significant airway obstruction. Plateau pressure reflects the pressure applied to the small airways and alveoli after the air settles in the lungs. It is extremely important to monitor plateau pressure and ensure that it remains <35 cm H_2O to avoid alveolar overdistension and barotrauma. When plateau pressure is normal and intrinsic PEEP is <15 cm H_2O , peak pressure elevations are immaterial. Therefore, while high inspiratory flow rates elevate the peak pressure, it is unnecessary to reduce flow rates to decrease peak pressure. In fact, it is most often necessary to increase the inspiratory flow rate in order to decrease inspiratory time, which also results in increased peak pressure. Peak pressure is determined by the rate of airflow, not the absolute volume of air nor the respiratory rate.

35 Answer C. *Pneumococcus* is by far the most common cause of pediatric bacteremia. Less common causes include the other answer choices. Patients with higher peripheral WBC counts are at higher risk for bacteremia, but patients with *H. influenzae* and *N. meningitidis* bacteremia often have only mildly elevated WBC counts. Meningococcal bacteremia has the worst prognosis among all the answer choices.

36 Answer B. Avulsed primary teeth should never be reimplanted, as they may fuse with underlying secondary teeth and cause considerable cosmetic deformity. Avulsed secondary teeth should be reimplanted as soon as possible. If teeth are reimplanted within 30 minutes, approximately 100% will be viable, but if 2 hours have elapsed since avulsion, the chance of successful reimplantation is essentially zero. The best-known medium for transporting an avulsed tooth is its own socket, followed by Hank's solution; cold milk is the best alternative if either of these is not available. Teeth may be secured for up to 48 hours by reimplanting the avulsed tooth and securing it to two neighboring teeth on either side with a periodontal pack. Before reimplantation, avulsed teeth should be gently rinsed with saline. Teeth should never be scrubbed or treated with any cleaning solution as this

will destroy the periodontal ligament fibers which are essential for successful reimplantation.

37 Answer A. Traumatic diaphragmatic injuries are almost equally caused by blunt and penetrating mechanisms. They much more commonly occur on the left side, because the liver serves as excellent protection against both injury and post-traumatic herniation. Once the diaphragm is injured, the defect remains without spontaneous healing due to the constant pressure subjected to the diaphragm by normal respiratory forces. The main problem with missed diagnosis is the high rate of delayed herniation of abdominal contents into the thorax, which can occur months or even years after the initial injury. None of the standard diagnostic tests for trauma (Focused assessment of sonography in trauma [FAST], CT scan, diagnostic peritoneal lavage [DPL], radiography) is sensitive or specific enough to accurately evaluate for diaphragmatic injury. Direct visualization with thoracoscopy or laparoscopy in suspected cases is required.

38 Answer D. The Focused assessment of sonography in trauma (FAST) scan consists of a series of ultrasonographic images designed to assess for the presence of hemoperitoneum. Ultrasonography of the right upper quadrant, left upper quadrant, and suprapubic regions aids in this determination. A fourth view in the subxiphoid region focuses on the pericardium to assess for effusion or tamponade. The FAST scan is ideally performed in the patient with blunt trauma just after the primary survey is complete and in conjunction with plain radiographs of the chest and pelvis. Pelvic fracture is assessed by the initial radiograph of the pelvis. The kidneys and abdominal aorta are retroperitoneal structures which cannot be diagnosed with the use of FAST scan. Diaphragmatic injury is notoriously difficult to diagnose with noninvasive studies (including CT, FAST, and diagnostic peritoneal lavage [DPL]) and may require thoracoscopy or laparoscopy for definitive diagnosis.

39 Answer E. The patient has otitis externa, inflammation of the external ear and tympanic canal almost always because of infection. Trauma and excessive moisture are commonly implicated in the development of the condition. Patients generally present with otalgia and otorrhea. In nontoxic patients, it is treated with topical acetic acid washes with or without topical antibiotics and steroids. A cotton or methylcellulose wick for drainage of the tympanic canal may be placed 1 cm deep in the ear and stays for 2 days. Systemically ill patients or diabetic patients require systemic antibiotics and sometimes admission.

Antihistamines can be used for symptomatic relief but do not affect the duration of illness. Tympanostomy tubes and adenoidectomy may be indicated for prevention of chronic/recurrent otitis media, but have no effect on acute management of otitis externa. Herpes zoster can occur in the ear, and is referred to as Ramsay Hunt syndrome. This condition requires antivirals and is associated with a vesicular rash and sometimes cranial nerve palsies.

40 Answer B. *C. trachomatis* causes ocular trachoma in many third world countries (considered the most common cause of preventable blindness worldwide) and is an important sexually transmitted disease in the United States. In the United States, *C. trachomatis* is a major cause of pelvic inflammatory disease (PID), or cervicitis as well as urethritis in men. A different serotype of the organism is also responsible for lymphogranuloma venereum, a more invasive sexually transmitted disease.

41 Answer D. As with other venomous bites, scorpion envenomation is more severe in children than in adults due to the smaller body size and subsequent volume of distribution. Though it has not been scientifically studied, morphine has been reported to trigger arrhythmias in the setting of scorpion envenomation so narcotics are avoided. Scorpion venom is primarily neurotoxic rather than cardiotoxic. Initially, the venom produces a cholinergic syndrome resulting in hypersalivation, lacrimation, urination and urinary incontinence, defecation, gastrointestinal upset and emesis ("SLUDGE" syndrome). Some authors recommend atropine use in cases of hypersalivation and bronchorrhea as a means of averting intubation. However, scorpion envenomation also triggers norepinephrine release resulting in tachycardia, hypertension, myocardial depression, and pulmonary edema. Severe hypertension may occur and should be treated with nitroprusside. In most cases, patients only experience local pain and paresthesias that may last for several hours. Supportive care is all that is required, with monitoring of the airway, EKG for ST-segment changes, and vital signs.

42 Answer D. Twenty-two percent to 39% of cases are caused by medications. Delirium that begins while patients are taking a drug usually ceases once the drug is discontinued. All of the other findings listed can cause delirium in elderly patients.

43 Answer E. Black widow spider bites are characterized by an initial pinprick sensation followed by a mild local inflammatory response. However, within 1 hour, crampy myalgias develop at the bite site and spread up the extremity, eventually involving

the entire body. Classically, myalgias are most intense in the chest and abdomen and patients may present with a rigid abdomen that is impossible to differentiate clinically from peritonitis. Patients also frequently have associated hypertension, diaphoresis, nausea, vomiting, headache, dizziness, and weakness. Symptoms typically begin to abate within a few hours with only supportive care. Owing to their small size, however, children may suffer from complete cardiovascular collapse with the same degree of envenomation.

44 Answer C. *H. pylori* is the most common cause of gastritis. In acute *H. pylori* gastritis, patients commonly present with epigastric pain, nausea, and vomiting. Gastritis is a histologic diagnosis. Furthermore, although endoscopy reveals an inflamed, edematous, and friable gastric mucosa, there may be a lack of neutrophilic infiltrates in which case many authors prefer the less specific term *gastropathy*. In *H. pylori* gastritis, there is an intense infiltrate, but several of the other agents listed cause generalized inflammation of the gastric mucosa without such an infiltrate. Alcohol, aspirin or other NSAIDs, and Crohn's disease may all cause gastritis. Caffeine is not a cause of gastritis but may predispose patients to GERD by lowering the tone of the lower esophageal sphincter muscle.

45 Answer A. Between 30% and 80% of alcoholics have magnesium deficiency. Patients with hypomagnesemia are frequently asymptomatic or manifest only nonspecific symptoms. The most prominent symptoms in the ED are neuromuscular and cardiovascular, and magnesium deficiency tends to mimic calcium deficiency. The mechanism of hypomagnesemia in alcoholism is thought to be a combination of malnutrition, increased renal excretion, and gastrointestinal losses from vomiting and diarrhea. Diuretic therapy is also a very prevalent cause of hypomagnesemia, although the subsequent volume loss increases magnesium reabsorption in the proximal tubule. Therefore, magnesium depletion in the setting of diuretic therapy tends to be modest. Hypomagnesemia is the most common electrolyte abnormality in ambulatory diabetic patients and is also common in diabetic ketoacidosis. In these patients, magnesium is lost through the urine due to glycosuria.

46 Answer D. Although all the choices are risk factors for aortic dissection, the most common is hypertension. Though approximately half the number of patients with Marfan's syndrome develop aortic dissections, <10% of all dissections are in Marfan's patients.

47 Answer E. Flexor tenosynovitis is a purulent infection of the flexor tendon sheath that usually results from a penetrating wound of the digital flexor surface. The infection spreads unimpeded sheath and the patient presents with acute pain and signs of inflammation in the involved digits. Kanavel's four cardinal signs of flexor tenosynovitis include all of the signs listed, although tenderness along the flexor tendon sheath is frequently cited as the most significant of these findings. Although early infections may be treated with intravenous antibiotics directed at *Staphylococcus*, incision and drainage is often required. Owing to the limited space in the sheath, purulent infections may cause a rapid increase in compartmental pressure resulting in ischemia to tendons and nerves. A hand specialist should be consulted as soon as the diagnosis is seriously considered.

48 Answer A. Sick sinus syndrome represents a range of dysrhythmias due to sinus node dysfunction, causing bradycardias, narrow-complex tachycardias, and combined states. It is treated by limiting the extent of the bradycardia (with a pacemaker) and the tachycardia (with an antidysrhythmic agent). It is usually seen in older patients or in patients taking AV nodal active agents. Lidocaine is used for ventricular dysrhythmias and has no role in the management of sick sinus syndrome. Atropine is the first-line agent for sick sinus patients with severe bradycardia. Atrial fibrillation is a common tachydysrhythmia seen in sick sinus syndrome.

49 Answer D. Owing to the anterior communicating artery, lesions of the anterior cerebral artery proximal to the communicating artery are generally well tolerated. Lesions distal to this anastomosis result predominantly in leg weakness and sensory loss as well as a variety of personality and behavioral changes. These changes include abulia, which is the inability of patients to make decisions. The upper extremities may be involved but are typically only mildly affected. Furthermore, the deficits are usually most marked distally. The tongue and the face are generally spared.

50 Answer B. Nitroprusside is a strong arterial and venous dilator only available as an IV drip. It is easily titrated and provides effective and predictable BP control. Extravasation of nitroprusside causes severe skin necrosis. Nitroprusside is metabolized to thiocyanate and excreted renally. Cyanide toxicity is not common, but thiocyanate toxicity can occur in renal failure, causing systemic symptoms. Nitroprusside may increase cerebral blood flow and intracranial pressure (ICP). Thiocyanate may cause damage to

the fetal thyroid and nitroprusside should be avoided during pregnancy. Nitroprusside is extremely fast acting, with a rapid onset and offset, making it ideal for rapid, predictable BP control.

51 Answer D. The patient has scattered human bite marks, which are circular in nature and have a perforated, erythematous border. Human bites are a common sign of child abuse. Management involves tetanus prophylaxis, treatment of associated cellulitis, and notification of appropriate social services. The rash of Henoch-Schönlein purpura presents as palpable purpura on the buttocks and lower extremities. Idiopathic thrombocytopenic purpura (ITP) presents as nonpalpable petechiae and purpura with laboratory evidence of low platelets. The rash of Lyme disease, erythema migrans, is an erythematous rash with central clearing, classically on the trunk in a patient with travel to an endemic area. Roseola presents as sudden onset of fever in young children, followed by a generalized macular rash after the patient has completely defervesced. (Figure from Reece RM, Ludwig S. Child abuse: medical diagnosis and management, 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 2001;150, with permission.)

52 Answer C. In symptomatic individuals, the most common manifestation of infection with *B. pertussis* is a prolonged, spasmodic cough that may last for several weeks. In adolescents and adults, the mean duration of illness is between 36 and 48 days. Despite widespread belief that childhood vaccination confers lifelong immunity, the last booster is given at age 4 to 6 in the United States, and it generally provides immunity until the age of 10 to 12 years. Because no further boosters are currently recommended in the United States, patients remain susceptible to infection in their early teenage years into adulthood. In children, the classical pertussis infection occurs in three discrete phases—the catarrhal phase, paroxysmal phase, and convalescent phase. In adults, however, prolonged cough may be the only manifestation of infection. Between 70% and 99% of adolescents and adults have paroxysmal cough, associated with an inspiratory whoop in 8% to 82% of patients (i.e., highly variable), coughing during the night in 65% to 87% of patients, and post-tussive vomiting in 17% to 50%. Patients may also experience episodes of choking, sweating attacks, syncope, or encephalopathy. Erythromycin is the treatment of choice for symptomatic patients and for prophylaxis of asymptomatic patients who have come into contact with infected individuals. Antibiotics may reduce both the severity and duration of symptoms if they are given to affected patients within 1 week of the onset of symptoms. However, because *B. pertussis* has been

isolated from affected individuals who are 3 weeks into their illness, treatment is recommended for all individuals who have had symptoms for 4 weeks or less. Such treatment is thought to decrease the carriage rate and shedding of the bacterium, thereby reducing transmission. High-risk personnel, including health care workers, or persons who may come into contact with infants of pregnant women in the third trimester, may receive treatment up to 6 to 8 weeks after developing symptoms.

53 Answer C. The image demonstrates a small bowel obstruction (SBO). Postoperative adhesions account for more than 60% of cases, malignant neoplasms account for approximately 20%, and incarcerated hernias account for roughly 10% of cases. The classic mnemonic for the top three causes of small bowel obstruction is “ABC,” representing adhesions, bulges (hernias) and cancer. However, neoplasms are actually the second most common cause. Most tumors are metastatic lesions that cause extrinsic compression of the intestine secondary to peritoneal implants that have spread from an intra-abdominal primary tumor such as from the colon, ovary, or pancreas. The most common hernias to result in obstruction are ventral and inguinal hernias. Flat (or supine) films classically demonstrate multiple dilated loops of small intestine in a “stepladder” pattern without evidence of distal small bowel or colonic distention. Upright films demonstrate multiple air-fluid levels. As a general rule, the larger the number of dilated bowel loops, the more distal the obstruction. The overall sensitivity of plain films for an SBO is roughly 60%. (Figure reprinted with permission from Fleisher GR, Baskin MN. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003.)

54 Answer A. The patient has an acute anterior ST-segment elevation myocardial infarction (STEMI) with evidence of congestive heart failure (CHF) due to cardiogenic shock. In these patients, immediate angioplasty has been shown to reduce mortality more than fibrinolytic therapy, and is the preferred definitive therapy. Choices C and E are not appropriate for patients with acute STEMI. Choice D represents treatment of a non-ST-segment elevation myocardial infarction (NSTEMI).

55 Answer D. Pemphigus vulgaris is the most common form of pemphigus, although it is a rare disease. It most commonly affects older individuals in the sixth decade. Nikolsky's sign, which occurs when pressure applied to the margin of a blistered or ulcerated lesion expands the lesion in to the adjacent apparently normal skin, is the clinical hallmark of

the disease. Although antibiotics are important in cases of secondary infection, corticosteroids are the mainstay of therapy. Most patients have oral lesions that start as blisters, which then spontaneously rupture to leave painful oral ulcers that are slow to heal. Oral ulcers may precede cutaneous disease by several months. The cause of the disease is unknown, although there is a genetic predisposition and an autoimmune mechanism involving circulating IgG antibodies to keratinocytes.

58 Answer B. The most dangerous cause of neonatal conjunctivitis is *N. gonorrhoeae*. It is less often seen in Western countries due to chemoprophylaxis, but is still an important cause of ophthalmia neonatorum due to its potential for invading the intact corneal epithelium and causing blindness. Treatment should be prompt with topical and parenteral antibiotics. Choices A and C occur more often in slightly older infants and cause less severe sequelae. Choices D and E may be more common given the practice of prophylaxis of all neonates with erythromycin ointment, but both processes are easily halted by removing the erythromycin and cause no long-lasting sequelae.

59 Answer A. The most common cause of upper GI bleeding in both the general population and alcoholics is peptic ulcer disease. When combined with NSAIDs and other ulcerogenic drugs, alcohol can contribute to the loss of protective gastric mucosal lining. Treatment in alcoholics is the same as for nonalcoholics, with special attention to electrolyte management, prevention of alcohol withdrawal, and attention to seizure precautions. Gastric and esophageal varices occur at a higher rate in those alcoholics who have a history of portal hypertension from cirrhosis. Boerhaave's syndrome refers to rupture of the esophagus from forceful vomiting. It usually occurs in alcoholics, and presents more often as sepsis and hypovolemia due to mediastinitis rather than GI bleed. Arteriovenous malformation is a more common cause of lower GI bleed than upper GI bleed.

60 Answer E. The patient has Mobitz type II second-degree atrioventricular (AV) block, which is an indication for admission to a telemetry unit and possible pacemaker placement. The PR interval is prolonged and does not show any observable pattern of increasing prolongation as in Mobitz type I second-degree AV block (Wenckebach phenomenon). Dropped QRS complexes do not occur in any predictable pattern like they do in Mobitz type I. Cardioversion and amiodarone are not indicated in stable bradydysrhythmias, and defibrillation of an awake patient is never indicated. (Figure from

Fowler NO. *Clinical electrocardiographic diagnosis: A problem-based approach*. Philadelphia: Lippincott Williams & Wilkins; 2000, with permission.)

59 Answer D. All of the drugs listed except for hydrocortisone are fluorinated corticosteroids that should not be used on the face. Corticosteroids are fluorinated to increase potency but fluorination also increases side effects. Although fluorinated compounds may have a role in the treatment of facial rashes, drugs used for that purpose should be prescribed by dermatologists.

60 Answer C. Ipratropium is primarily useful as a second-line, adjunctive agent in the treatment of patients with acute asthma exacerbations. Multiple trials in the late 1990s as well as a few meta-analyses have demonstrated benefit in patients treated with a combination of albuterol and ipratropium versus albuterol alone. In pediatric populations, combination therapy decreases treatment time in the ED, albuterol dose requirements before discharge, as well as hospitalization rates. In adults, combination therapy has been shown to increase peak expiratory flow rate (PEFR) more than albuterol alone. However, there is conflicting data regarding ipratropium and some studies have failed to demonstrate benefit. Owing to this conflicting data, ipratropium has been relegated to use as a second-line agent. As it appears to be safe and well tolerated, most experts advise using it as an adjunctive agent in severe asthma exacerbations. It is not recommended for use as a single agent primarily because of its slower onset of action and because it only alleviates cholinergically mediated bronchoconstriction. The main benefit of ipratropium over atropine is its superior side effect profile.

61 Answer D. Initial symptoms are typically "positive," such as tingling or burning, rather than "negative," such as numbness. The symptoms begin distally and progress more proximally and affect the lower extremities more than the upper extremities. Over time, weakness develops usually involving dorsiflexion of the big toe followed by weakness of foot dorsiflexion, foot drop, loss of ankle jerks, and finally a "steppage gait."

62 Answer A. Vitreous hemorrhage is usually caused by diabetic retinopathy or retinal detachments. Symptoms are similar to retinal detachment, with floaters early in the course and painless visual loss later. The red reflex is usually diminished or darkens into a black reflex. As in most acute ophthalmologic disorders, Valsalva maneuvers and recumbent positioning are to be avoided. The presence of an afferent pupillary defect indicates

a concomitant retinal detachment. Ophthalmologic consultation should be sought in the ED in patients with suspected retinal detachment or traumatic vitreous hemorrhage.

- 63** Answer B. Adenosine is an extremely fast-acting AV nodal blocker used for the treatment of narrow-complex tachydysrhythmias, and has little effect on ventricular cells. Onset of action is 5 seconds and duration is 30 seconds, with a half-life of 10 seconds. For this reason, adenosine must be pushed rapidly with a saline flush immediately following the intravenous push.
- 64** Answer B. The patient has acute necrotizing ulcerative gingivitis (ANUG), commonly known as *trench mouth*. The gingiva is painful and friable, unlike ordinary gingivitis. Treatment involves oral antibiotics and good oral hygiene. Spirochetes and fusobacteria predominate in what is likely a bacterial overgrowth process. Vincent's angina refers to extension of ANUG to the tonsils, and cancrum oris refers to extension to the lips and buccal mucosa. Direct contact with secretions does not confer increased risk.
- 65** Answer E. Most patients suffering peptic ulcer perforation are elderly and NSAID use is involved in roughly 50% of cases. Smoking is the leading risk factor for perforation among young patients. Cocaine use may lead to perforation of ulcers of the juxtapyloric region, possibly because of vasoconstriction or vascular thrombosis. The pain of peptic ulcer perforation is classically described in three stages. Initially, patients present with severe, diffuse abdominal pain and may present with signs of shock. After minutes to hours, this phase tends to resolve and patients begin to look and feel better and may have normal vital signs. However, they will nearly always have signs of peritonitis upon physical examination. Most notably, patients will have a rigid, tender abdomen, and signs of pelvic peritoneal inflammation (assessed by a rectal examination). The final stage is characterized by worsening abdominal pain, abdominal distension, and signs of sepsis. Interestingly, only 70% of patients will have evidence of intraperitoneal free air on upright chest or abdominal radiography. In vague cases, an upper GI series may be performed with water-soluble contrast media. Endoscopy is contraindicated because the insufflation of air may open a spontaneously closed perforation.
- 66** Answer E. Popliteal artery aneurysms are the most common nonaortic aneurysms, and the large majority occurs in conjunction with concomitant abdominal aortic aneurysm (AAA). Other peripheral

arterial aneurysm locations are femoral, splenic, and hepatic.

- 67** Answer B. With the history of recent diagnosis of schizophrenia (and likely newly started antipsychotic medication) the patient has evidence of neuroleptic malignant syndrome. Hyperthermia, muscle rigidity, altered mental status, and elevated creatine phosphokinase (CPK) levels are characteristic. Treatment involves aggressive sedation with benzodiazepines, cooling, and paralysis with neuromuscular blockade in severe cases. Acetaminophen is unlikely to be of benefit in patients with hyperthermia because hyperthermia does not exhibit an elevation of the hypothalamic set point as is seen in fever. Amantadine and bromocriptine are dopamine agonists which have not been proved to be beneficial in patients with neuroleptic malignant syndrome. Haloperidol is an antipsychotic which might further exacerbate the pathophysiologic process in this case. Dantrolene, which blocks calcium release in muscle cells, may afford some benefit, but is unlikely to be more effective than benzodiazepines and paralytics.
- 68** Answer C. Family history of suicide is an independent risk factor for completed suicide. Other risk factors include depression, schizophrenia, substance abuse, prior attempts, presence of a firearm in the home, and feelings of hopelessness and long-term loneliness. Young women have the lowest rate of completed suicide, but have the highest rate of suicide attempts. Patients with antisocial personality disorder do not have higher rates of suicide completion unless there is comorbid substance abuse. Generalized anxiety disorders and simple phobias do not confer a higher risk of completed suicide in the absence of depression or substance abuse.
- 69** Answer C. The patient likely has a radial head subluxation, commonly referred to as a nursemaid's elbow. With forced extension of the arm, the radial head slips out of the annular ligament. Without a history of trauma or severe tenderness on examination, radiographs are not necessary. Reduction is best performed by flexion-supination or flexion-hyperpronation of the forearm with pressure on the radial head. An audible or palpable click indicates successful reduction. Flexion-hyperpronation may be more successful than flexion-supination, but both strategies can be employed in the same reduction attempt for optimal results.
- 70** Answer C. The superior lid contains a hordeolum (or sty) with surrounding blepharitis. A hordeolum refers to localized infection of a meibomian gland in the lid, usually because of *S. aureus*.

Treatment involves warm compresses, with topical erythromycin ointment applied to the lid if there is a surrounding blepharitis. Systemic antibiotics are rarely indicated in patients with hordeolum. Eyelid culture is unlikely to be helpful or easy to obtain. Aspiration of the area is strictly contraindicated given the proximity to the globe. Topical antivirals are indicated only in patients with herpes keratitis. The lower lid has a chalazion, which is a subacute, granulomatous lesion also treated with warm compresses. (Figure from Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001, with permission.)

72 Answer C. This patient has Rocky Mountain spotted fever (RMSF). Classically, patients with RMSF develop a maculopapular rash on the wrists and ankles 4 days after being bitten by an American dog tick (*D. variabilis*) or Rocky Mountain wood tick (*D. andersoni*) infected with *R. rickettsii*. Despite its name, North Carolina and Oklahoma account for more than one third of RMSF cases. The rash rapidly spreads centrally to the trunk and extremities and becomes petechial and purpuric. However, up to 15% of patients do not develop a rash ("spotless fever"). Other common findings include a high fever (typically $>102^{\circ}\text{F}$), myalgias (particularly of the gastrocnemius), headache, vomiting, and malaise. Doxycycline is the treatment of choice in all patients except for pregnant women, who should receive chloramphenicol (CAM). CAM is the drug of choice during pregnancy due to the effects of tetracyclines on fetal bones and teeth. However, CAM should be used with caution and should be avoided in near-term pregnancies or during the third trimester in order to avoid fetal bone marrow suppression, which results in the "gray baby syndrome." Previously, CAM was the recommended agent in children as well, but because doxycycline is more effective and the risk of teeth staining is low given the short duration of treatment, doxycycline is now the drug of choice for all patients except pregnant women.

73 Answer C. Patients with anterior glenohumeral (shoulder) dislocations may have associated axillary nerve injury. Findings include diminished sensation in the region of the deltoid and impaired deltoid function exhibited by loss of muscle contraction with abduction against resistance. Other less common findings may include more distal upper extremity nerve compression. Lower extremity or truncal area hypoesthesia would be extremely atypical.

74 Answer E. Reiter's syndrome is a reactive arthritis that occurs following *C. trachomatis* infection of the

genitourinary tract or *Shigella*, *Salmonella*, *Campylobacter*, or *Yersinia* infection of the gastrointestinal tract. It is part of a group of arthritides known as the *seronegative spondyloarthropathies*. This group includes ankylosing spondylitis, psoriatic arthritis, reactive arthritis and the arthropathy of inflammatory bowel disease. They are grouped because of their common involvement of the sacroiliac joint, lack of rheumatoid factor, and presence of the HLA-B27 genetic marker. Reiter's syndrome is most common in young men aged 15 to 35 and occurs 2 to 6 weeks after an episode of urethritis or dysentery. The classic triad is arthritis, urethritis, and conjunctivitis. The arthropathy in Reiter's syndrome is an enthesopathy, which refers to pathology at the site of ligament or tendon insertion to bone. It most commonly involves the lower extremities, particularly the Achilles tendon ("lover's heel").

75 Answer D. Intravenous medications are most appropriate for rapid control of BP. Nicardipine is safe and effective during pregnancy and produces predictable control of BP during hypertensive crises. Nitroprusside also provides excellent BP control, but has not been proved safe during pregnancy. Nitroglycerin causes preload reduction, but has little effect on afterload reduction, which is the more important intended mechanism of action for antihypertensive agents during crises. Clonidine and hydrochlorothiazide are oral medications that have a limited role in acute management of BP during hypertensive crises due to unreliable absorption and efficacy.

76 Answer B. Reciprocal ST depressions associated with ST elevations have high specificity for acute MI (reported to be $>90\%$) and are not usually present in nonischemic conditions. Their presence confers a higher risk of poor outcomes. Reciprocal ST depressions are usually downsloping. Most inferior wall MIs exhibit reciprocal ST depressions, whereas most anterior wall MIs do not.

77 Answer C. Most authors have abandoned the old terminology of hyperglycemic hyperosmolar nonketotic coma (HHNC) in favor of HHS. HHS reflects the fact that $<20\%$ of these patients present in a coma. HHS is the result of an unremitting osmotic diuresis due to hyperglycemia, and is characterized by extreme hyperglycemia (mean glucose is $>1,000$), hyperosmolarity (at least >320 mOsm per L), and dehydration (average fluid deficit is roughly 10 L). Although a minor ketosis may be present, it is never significant. Infections such as pneumonia or urosepsis are the most common precipitants, accounting for 60% of cases. The mortality rate, which hovers at approximately 15%,

is significantly higher than in patients with DKA. The degree of mental status change correlates with the serum osmolarity rather than the degree of hyperglycemia. Insulin is a second-line agent in HHS. It should never be given without prior intravenous fluid administration because insulin delivery will encourage glucose utilization and entry into cells resulting in an acute drop in intravascular fluid volume and possible circulatory collapse.

Answer A. The patient has evidence of serotonin syndrome, a constellation of neurologic, GI, and cardiac findings caused by excessive serotonin activity due to medications. The diagnostic criteria include specific symptoms, the presence of two or more serotonergic drugs, and the absence of neuroleptic agents or other cause for the symptoms. Hyperreflexia, hyperthermia, altered mental status, and diarrhea are characteristic. Medications associated with serotonin syndrome include combinations of the following: Selective serotonin reuptake inhibitor (SSRI)s, monamine oxidase inhibitors (MAOIs), catecholamine releasers (cocaine, amphetamines, and dextromethorphan), nonselective serotonin reuptake inhibitors (tricyclic and atypical antidepressants, carbamazepine, meperidine, methadone), and serotonin agonists (buspirone, lithium, LSD, sumatriptan). Treatment of serotonin syndrome is supportive, but cyproheptadine, a serotonin antagonist, may be helpful in some cases. Choices B to E do not contribute to serotonin syndrome.

Answer C. Condyloma acuminatum is a sexually transmitted disease caused by human papillomavirus (HPV). It is usually found in the genital area, but may be found elsewhere. It most commonly occurs in young men. It typically starts as small, pedunculated papules that are 2 to 3 mm in diameter and 10 to 20 mm long. They may occur as single papule or in clusters may develop into large, cauliflower-like masses. The surface is dry and highly keratinized, and they are typically asymptomatic unless they become superinfected. In contrast, condyloma lata, which is caused by *T. pallidum* (syphilis), is a weeping, wart-like lesion that emits a foul odor. The two are easily distinguishable clinically and neither lesion has bluish telangiectasias.

Answer A. Acalculous cholecystitis comprises roughly 15% of acute cholecystitis cases. It most commonly occurs in elderly men who are recovering from nonbiliary tract surgery in an intensive care unit (ICU) setting. Patients in ICU settings are often subjected to prolonged fasting and immobility, which prevents gallbladder emptying and prolongs exposure of the biliary epithelium to the highly acidic

and noxious bile. Such patients also often experience hemodynamic instability as a result of their primary disease process, which places the biliary epithelium at risk for ischemia. The presentation of acalculous disease in this population is often subtle, and may declare itself as an isolated and unexplained fever. This leads to a delay in diagnosis and contributes to its far more fulminant course. By the time it is diagnosed, approximately half the number of patients have already experienced a major complication such as gangrene or perforation. The mortality rate ranges from 10% to 50%. Patients with AIDS are known to be at increased risk for the disease, especially in the setting of cytomegalovirus or *Cryptosporidium* infection, though the reasons for this are not known.

Answer D. The Kleihauer-Betke test (KBT) detects the presence and quantifies the volume of fetal RBCs in the maternal circulation. Unfortunately, it is an insensitive test, requiring a minimum of 5 mL of fetal hemorrhage for detection. Because as little as 0.01 to 0.03 mL of fetal blood may result in maternal Rh sensitization, the KBT is not useful in most pregnant patients. Therefore, all Rh-negative pregnant patients should be given Rh immune globulin. The dose is 50 μ g in the first 12 weeks, and 300 μ g after 12 weeks' gestation. However, in cases in which extensive maternal-fetal hemorrhage (MFH) is suspected, the KBT may be useful because it can identify patients in whom >30 mL of MFH has occurred. Such patients should receive a second 300 μ g dose of Rh immune globulin because each 300- μ g dose is only enough to prevent sensitization from 30 mL of fetal blood. The only patients in whom this occurs are patients who have suffered catastrophic trauma (<1% of pregnant trauma victims require a second dose). Therefore, the KBT should not be performed in most pregnant ED patients who have suffered trauma.

Answer D. RSV is the most common cause of bronchiolitis, followed by parainfluenza, influenza, adenovirus, and rhinovirus. To avoid infecting other uninfected patients and health care workers (who then transmit infections to yet more patients), patients with RSV bronchiolitis should be placed in respiratory isolation. If multiple patients with RSV bronchiolitis are admitted, then the group could be isolated as a cohort until discharge. Bacillus anthracis is not transmitted from person to person. Patients with COPD exacerbations and community-acquired pneumonia also do not require isolation. Finally, the medical student with a positive pressure differential (PPD) but no symptoms of active TB has latent TB infection and is not contagious to other people.

82 Answer C. This patient has an aortoenteric fistula until proved otherwise. The classic presentation is abdominal pain and gastrointestinal bleeding that resolves spontaneously (a so-called "herald bleed") in a patient with a prior history of an aortic graft. The initial bleeding is thought to stop when splanchnic pressure drops and allows an adequate clot to form. However, the initial bleed is often followed by a massive and often fatal hemorrhage days or possibly weeks later. The fistula is caused by *S. aureus* or *Escherichia coli* infection of a the prior graft and typically forms between the aorta and the distal duodenum. Therefore, all patients with a history of aortic graft and gastrointestinal bleeding should undergo esophagogastroduodenoscopy to search for a fistula in the distal duodenum. Most of these patients, however, have an alternative, more common cause of gastrointestinal bleeding.

83 Answer D. Swallowed maternal blood is a common cause of factitious gastrointestinal bleeding in young neonates. The Apt test involves the application of alkali to a small sample of bloody stool. Owing to its different composition from adult hemoglobin, fetal hemoglobin (which is composed of two α and two γ subunits instead of two α and two β subunits as in adult hemoglobin) is resistant to denaturation by this application. After the application of alkali, fetal hemoglobin will remain pinkish red upon microscopic examination whereas adult hemoglobin will appear brownish. Both the Rosette test and the Kleihauer-Betke test (KBT) are used to detect the presence of fetal maternal hemorrhage.

84 Answer B. The image reveals a posterior elbow dislocation. Brachial artery disruption or injury is the most serious complication of posterior elbow dislocations, but ulnar nerve injuries are the most common complication. Median nerve injuries are the second most common associated injuries and may occur in concert with ulnar nerve injuries. Decreased function in the distribution of either the ulnar, median, or radial nerves after reduction is an indication for surgical exploration and decompression. Postreduction functional loss most commonly occurs because of entrapment of the median nerve. Functional loss that exists before reduction is most commonly a neurapraxia and spontaneous recovery is the rule. Therefore, such injuries should be well documented and followed by close outpatient observation. The brachial artery is the most commonly injured vascular structure in posterior elbow dislocations. Although the presence of a radial pulse is reassuring, it does not ensure an intact brachial artery, particularly in the setting of a compartment syndrome. Therefore, physicians

should have a low threshold to perform angiography on individuals at risk for brachial artery injury. The presence of a distal pulse deficit mandates exploration and repair. A compartment syndrome at the elbow may result in Volkmann's ischemic contracture due to ischemia, injury, and fibrosis of forearm structures. In its most severe form Volkmann's ischemic contracture results in elbow flexion, forearm pronation, wrist flexion, thumb adduction, metacarpophalangeal joint extension and finger flexion. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:492.

Answer A. The diaphragm elevates during pregnancy, resulting in decreased total lung capacity and functional residual capacity. However, diaphragmatic excursion actually increases resulting in an increased tidal volume and mild alveolar hyperventilation despite the fact that the respiratory rate remains unchanged. The RBC mass and hemoglobin increase throughout pregnancy. RBC mass rises steadily to term, as it increases 18% without iron supplementation. In contrast, the plasma volume, which also increases during pregnancy, plateaus at 30 to 35 weeks' gestation. The peripheral WBC count steadily rises during pregnancy and may be as high as 20,000 to 30,000 mm^3 during labor after which it returns to normal in approximately 1 week. Finally the glomerular filtration rate increases throughout pregnancy.

Answer E. Placenta previa refers to a placenta that overlies or lies in close proximity to the internal cervical os. The classic presentation of women with placenta previa is painless second or third trimester vaginal bleeding. However, most women are asymptomatic and are diagnosed on routine ultrasonography. Digital vaginal examination should never be performed before ultrasonography in the second or third trimester because it can provoke disastrous bleeding in patients with asymptomatic placenta previa. With progression of pregnancy, 90% of low-lying placentas will migrate away from the cervical os. Disseminated intravascular coagulation is a common complication of abruptio placentae but not placenta previa.

Answer C. There is some disagreement regarding the optimal temperature for rewarming or thawing frostbitten tissue. However, all authors agree that optimal rewarming occurs through immersion in a water bath with a closely regulated temperature. Most sources cite 40°C to 42°C as the optimal range, although temperatures as low as 35°C have

been recommended as they tend to cause less pain during rewarming. Upon arrival, the affected area should be rapidly rewarmed for 15 to 30 minutes or until thawing is complete. Indicators of successful thawing include increased flexibility, erythema, and hyperemia. Rewarming can be intensely painful, and parenteral analgesics may be required, especially in cases of deep frostbite. Direct tissue massage should never be performed as it may cause increased tissue loss. In addition, field rewarming and rewarming with direct heat sources should never be performed because of the high risk of incomplete thawing and refreezing which results in increased tissue loss.

Answer D. Iron toxicity can be life threatening. Ingestion of large quantities of iron overwhelms the body's iron-binding capacity and causes gastrointestinal, cardiac, CNS, hepatic, and renal damage. Nausea, vomiting, diarrhea, and GI bleeding are the most common symptoms. Diagnosis involves serial serum iron levels and plain abdominal radiographs to demonstrate passage of the radiopaque iron pills. Treatment involves whole bowel irrigation with polyethylene glycol, deferoxamine chelation in patients with severe overdoses (defined as rising iron levels, absolute level $>500 \mu\text{g}$ per dL, or worsening clinical course), and dialysis of the chelated iron when renal failure is present. Activated charcoal does not adequately bind heavy metals. Gastric lavage is rarely indicated for any overdose, except in certain cases when patients present within 30 minutes of overdosing. Ipecac is almost never indicated for any overdose. Hemodialysis is only necessary when renal failure limits the body's ability to clear chelated iron.

Answer B. The patient has facial nerve paralysis from ipsilateral otitis media. The facial nerve is the most commonly affected cranial nerve in otic pathology due to its physical proximity to the middle ear. Paralysis of the whole face (upper and lower) indicates a peripheral rather than a central lesion. Treatment of facial nerve paralysis due to acute otitis media involves intravenous antibiotics, myringotomy to allow drainage, and tympanostomy tube placement.

Answer C. The patient has mitral stenosis (MS)—he has a diastolic murmur (either aortic regurgitation or MS) which is loudest at the apex (mitral). The number one cause of mitral stenosis by far is rheumatic heart disease. Symptoms include those associated with heart failure (dyspnea on exertion and orthopnea), due to left atrial hypertrophy and left heart failure, which eventually proceeds to right heart failure. The most common complication of MS

is atrial fibrillation, which puts the patient at high risk for thrombus formation and embolism.

Answer D. The foundation of treatment for rhabdomyolysis is the administration of large volumes of normal saline early in the course of the disease. Urine output should be maintained between 200 and 300 mL per hour and patients may require as much as 20 L of fluid in the first 24 hours to achieve such a flow rate. Mannitol is an osmotic diuretic that may help maintain urine output, especially in cases of oliguric renal failure. Bicarbonate causes urine alkalization, which helps to keep myoglobin soluble, and may therefore enhance its clearance. The goal is to keep the urine pH above 6.5. Deferoxamine is an iron chelator that may have a protective role as it inhibits lipid peroxidation, which may shield myocyte membranes. Furosemide has also been used in cases of oliguric renal failure. However, furosemide causes urine acidification and may therefore enhance myoglobin precipitation into casts resulting in worsening renal function.

Answer E. Pseudotumor cerebri, also known as *idiopathic intracranial hypertension*, is a syndrome of increased intracranial pressure (ICP) without an identifiable cause. To satisfy the diagnostic criteria for the disease, there can be no evidence of a mass, or a structural or vascular lesion on neuroimaging. Furthermore, the composition of the cerebrospinal fluid (CSF) must be normal, and any symptoms resulting from the disease must be completely attributable to papilledema or generalized elevated ICP. The most common presenting symptom is headache, which tends to be worse in the recumbent position and in the morning (after prolonged recumbency overnight). CT scan never reveals hydrocephalus. Abducens nerve palsy is the only cranial nerve palsy that commonly occurs and typically presents as intermittent or constant lateral binocular diplopia. Women are more commonly affected, with a 19 times increased incidence in obese women of childbearing age.

Answer A. Oxygen is the standard of care for cluster headache. Seventy-five percent of patients with cluster headache given 100% oxygen through face mask will experience complete or near-complete relief within 15 minutes. Because attacks of cluster headaches are self-limited and typically last no longer than 90 minutes, patients may not have pain by the time they reach the ED. Therefore, oxygen is a convenient therapy. Sumatriptan is the most effective self-administered medication. It is administered as a nasal spray, and is effective in more than 50% of patients within 15 minutes of use. However, its use is

not recommended in patients who are having more than two attacks per day because this would result in an overdose of the medication. Dihydroergotamine and zolmitriptan are also effective treatments. Narcotics, benzodiazepines, and corticosteroids have no role in acute cluster headache management.

92 Answer D. Patients with midline penetrating injuries to the neck and chest are at risk for a variety of injuries, including esophageal perforation. Symptoms of esophageal injury include pleuritic chest pain and odynophagia. Subcutaneous emphysema may be present, but is neither sensitive nor specific for the diagnosis. Esophagoscopy and esophagogram by themselves are not sensitive enough, but together improve accuracy for the diagnosis considerably. Bronchoscopy is useful for the significant proportion of patients who have concomitant tracheal injury, but has no role in diagnosing esophageal injury. Chest CT may offer indirect signs of esophageal injury such as pneumothorax or pneumomediastinum but cannot quantify the location or extent of esophageal perforation.

93 Answer B. Initial radiographs of pediatric patients with elbow trauma may not clearly demonstrate a fracture. The posterior fat pad, which is closely applied to the posterior portion of the humerus, is normally invisible in the intact elbow. Blood in the elbow joint due to fracture will cause this fat pad to show up as a dark line just posterior to the supracondylar region of the humerus. The anterior fat pad may be present in the intact elbow as a dark line, but enlargement of this into a sail shape indicates likely injury. On an anteroposterior (AP) view, the Baumann's angle is formed by a line parallel to the capitellar growth plate and a line parallel to the long axis of the humerus. A normal Baumann's angle is 75 degrees, and bilaterally equal Baumann's angles reduce the likelihood of unilateral fracture. On a lateral view of the normal elbow, the anterior humeral line should bisect the capitellum. With a supracondylar fracture, the anterior humeral line lies anterior to the midpoint of the capitellum.

94 Answer E. Diverticula are most common in the left colon, particularly the sigmoid colon, amongst patients from the Western world. Japanese patients most commonly have diverticula in the right colon. Even among Japanese who have immigrated to the United States and who consume a low-fiber, high-fat Western diet, diverticula are typically limited to the right colon. However, such patients have a significantly higher incidence of disease than their counterparts in Japan. The most common treatment for diverticular disease (in the absence

of diverticulitis) is a high-fiber diet. Barium enema is the study of choice for making a diagnosis, although it should be avoided in the setting of diverticulitis, because perforation may occur, allowing leakage of barium into the peritoneum.

95 Answer D. Diaphoresis with chest pain is an ominous clinical finding that should increase suspicion for acute coronary syndrome. Dyspnea and nausea are other, less specific symptoms associated with myocardial ischemia. Fever is uncommon, as is back pain, and should point to other causes of chest pain. Radiation to one or both arms increases the likelihood of cardiac cause—radiation to the right upper extremity may be even more specific than to the left side.

96 Answer A. *L. pneumophila* is an important cause of severe community acquired pneumonia. In patients with more severe symptoms due to community-acquired pneumonia (CAP), the percentage of *Legionella* spp. isolates increases. Epidemiologic studies have exposed links of legionellosis to exposure to contaminated water sources, such as air-conditioning units and cooling towers. Furthermore, older patients with a history of alcoholism, tobacco use, and COPD as well as patients on immunosuppressive therapy appear to be at higher risk. Although the role of *Legionella* spp. is still being defined in the setting of more benign illness, legionellosis is classically described as a severe infection, associated with high fevers, a dry cough which may turn productive late in the course, pleuritic chest pain, and prominent gastrointestinal symptoms including abdominal cramps and diarrhea. However, several studies have demonstrated that the clinical and radiographic features of the disease are nonspecific. Therefore, to make the diagnosis, laboratory testing is required. Urinary antigen testing is the test of choice as it is both highly sensitive (>90%) and specific (>99%), and is also quite rapid. Although antibiotic therapy should be started empirically before such results are obtained, urine testing can be initiated in the ED to guide the patient's further therapy and to provide useful information about prognosis.

97 Answer B. The recurrence rate after a single episode of uncomplicated diverticulitis is 20% to 30%. Furthermore, a high-fiber diet may help prevent further episodes. Young patients with diverticulitis are a special population because they tend to have more aggressive disease and the recurrence rate of diverticulitis is higher. Although resection of the disease segment remains elective, some authors recommend resection in all young patients due to their higher risk of recurrence. CT is the study of

choice in the ED because it reliably visualizes the site of inflammation and is very useful for detecting various complications (e.g., abscesses, perforation, fistulas). The mortality rate of hospitalized patients with diverticulitis is 1% to 6% for those requiring only medical management and 12% to 18% for those requiring surgery. Diverticulitis is the most common cause of a colovesical fistula. Furthermore, colovesical fistulas are the most common of all fistulas complicating diverticulitis. Such patients frequently present with findings of a urinary tract infection in addition to findings of diverticulitis.

139 Answer C. Diagnosing the poisoned patient can be extremely difficult, but identifying a specific toxidrome can speed up evaluation and management

considerably. As in all patients, airway should be assessed first, then breathing, then circulation. The only exception to this rule is when patients exposed an environmental toxin such as organophosphates must be decontaminated even before airway assessment to prevent exposure to health care workers. Most poisoned patients need only good supportive care for management—a specific antidote is helpful in only a minority of cases. Activated charcoal and whole bowel irrigation, not ipecac, are the mainstays of gastrointestinal decontamination, although inhibition of absorption with these agents has not been conclusively shown to improve clinical outcomes. Hospital urine drug screens detect several drugs of abuse, but these represent only a fraction of common toxins.



Test 4

Questions

- 1 Which of the following is the most common cause of death in children in the United States?
- (A) Infection
 - (B) Malignancy
 - (C) Trauma
 - (D) Congenital abnormality
 - (E) Stroke
- 2 Common features of atopic dermatitis include which of the following?
- (A) Pruritus
 - (B) Flexor surface involvement in adults
 - (C) Facial involvement amongst infants
 - (D) Frequent involvement of the hands in adulthood (hand dermatitis)
 - (E) All of the above
- 3 Which of the following is true regarding pediatric community-acquired pneumonia (CAP)?
- (A) The most common cause of pneumonia in the neonate is *Mycoplasma pneumoniae*.
 - (B) The incidence of CAP in children younger than five years old is higher than in middle-aged adults.
 - (C) It is easier to differentiate between typical and atypical pneumonia in pediatric patients.
 - (D) *Streptococcus pneumoniae* is the most commonly isolated organism in children aged 5 to 15 years.
 - (E) The presence of rhinorrhea, myalgias, or a concomitant illness in a family member is more common in viral pneumonia.
- 4 A 42-year-old woman presented to the emergency department (ED) with acute-onset epigastric abdominal pain and nausea without vomiting 15 hours earlier. Her workup revealed acute pancreatitis and she was admitted. After receiving appropriate analgesics and antiemetics, she is now hungry and wants something to eat. Which of the following is true?
- (A) She should undergo a period of bowel rest for 48 hours regardless of her laboratory results.
 - (B) She requires ongoing nasogastric (NG) suctioning until pancreatic enzyme abnormalities resolve.
 - (C) She should receive total parenteral nutrition for 72 hours.
 - (D) She will be allowed to eat once abdominal computed tomography (CT) reveals resolution of the signs of pancreatitis.
 - (E) She may eat a low calorie, carbohydrate-rich diet.
- 5 In setting of a normal peripheral white blood cell (WBC) count and a suspected "traumatic" lumbar puncture, the cerebrospinal fluid (CSF) should contain approximately 1 WBC per every _____ red blood cells (RBCs)?
- (A) 1
 - (B) 100
 - (C) 300
 - (D) 700
 - (E) 1,000
- 6 A 6-year-old girl is brought to the emergency room 4 hours after developing a brief choking episode while playing with her toys. Her chest x-ray is shown in Figure 4-1. Where is the foreign body located?
- (A) Esophagus
 - (B) Hypopharynx
 - (C) Trachea

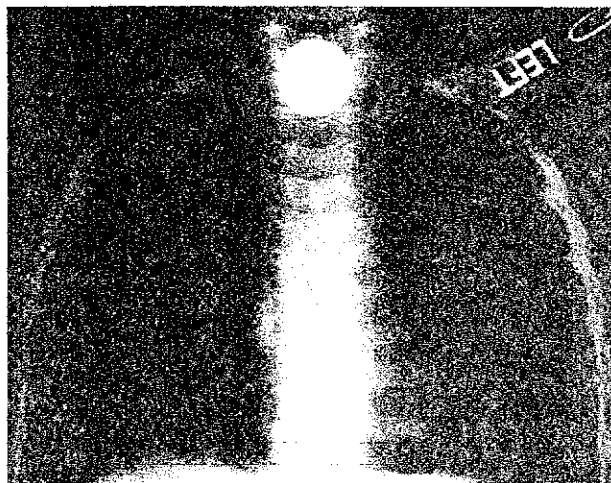


Figure 4-1.

- (D) Anterior mediastinum
(E) Not possible to determine from the information provided
- 7 A 4-year-old boy is brought to the ED with a severe sore throat and a history of "refusing to eat." He has a severe pharyngitis on examination, but a lateral neck x-ray is taken that you feel is consistent with a retropharyngeal abscess (RPA). You are surprised to find, however, that the patient's subsequent CT was normal. The radiologist tells you this was probably due to poor technique. What technique should be used to most accurately assess the prevertebral space on x-ray?
- (A) X-ray should be taken in flexion during expiration.
(B) The patient should be sitting upright when the x-ray is taken.
(C) The x-ray should be taken in flexion during inspiration.
(D) The x-ray should be taken in extension during expiration.
(E) The x-ray should be taken in extension and inspiration.
- 8 Which of the following is the most important factor in determining the chance of spontaneous passage of a kidney stone?
- (A) Composition of the stone
(B) Size of the stone
(C) Degree of pain
(D) Degree of nausea
(E) Age of the patient
- 9 Which of the following is a manifestation of hypocalcemia?
- (A) QTc shortening
(B) Polyuria
(C) Perioral paresthesias
(D) Nephrolithiasis
(E) None of the above
- 10 A nasogastric tube (NGT) should be
- (A) Placed in all patients with a complaint of gastrointestinal (GI) bleeding.
(B) Avoided in all patients with a complaint of GI bleeding.
(C) Placed only in patients who have ongoing hematemesis.
(D) Placed in patients who have rectal bleeding of uncertain origin.
(E) Avoided in patients with esophageal varices.
- 11 Which of the following is most characteristic of ethylene glycol overdoses?

- (A) Hypocalcemia
(B) Hypokalemia
(C) Microcytic anemia
(D) Thrombocytopenia
(E) Hypermagnesemia

- 12 A 42-year-old previously healthy woman presents with a "bad" sore throat and painful swallowing. She is febrile, but nontoxic and in no respiratory distress. A lateral soft tissue neck film is ordered and is shown in Figure 4-2. Which of the following is the cause of this patient's illness?



Figure 4-2.

- (A) Retropharyngeal abscess (RPA)
(B) Epiglottitis
(C) Peritonsillar abscess (PTA)
(D) Bacterial tracheitis
(E) Ludwig angina
- 13 A 47-year-old man without significant past medical history presents with a chief complaint of burning epigastric abdominal pain. It does not radiate and occasionally wakes him up in the middle of the night. He is on no medicines and denies drinking alcohol. You suspect he may have peptic ulcer disease and want to test him for the presence of *Helicobacter pylori*. Which of the following is the best initial screening method?
- (A) Serologic testing (IgG antibody testing)
(B) ^{13}C or ^{14}C urea breath testing

- (C) Referral for endoscopy and biopsy
- (D) Stool antigen test
- (E) Rapid urease test

14 Which of the following is true regarding malaria?

- (A) The causative organism is a parasite.
- (B) The vector is the male *Anopheles* mosquito.
- (C) Human-to-human transmission may occur through saliva.
- (D) *Vivax* malaria is the most severe variety.
- (E) Blackwater fever is usually caused by *ovale* malaria.

15 A 42-year-old man with a history of alcohol abuse presents with acute epigastric abdominal pain. His workup reveals acute pancreatitis and he denies any prior history of pancreatitis. A CT scan that was ordered as part of his workup is shown in Figure 4-3. Which of the following is true?

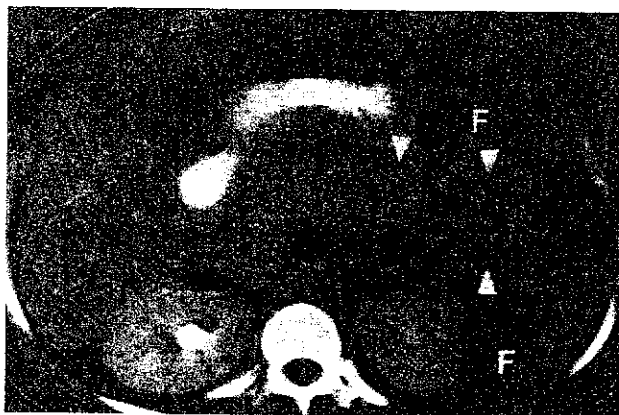


Figure 4-3.

- (A) The CT is indicative of chronic pancreatitis.
 - (B) An urgent surgical consult is required for drainage.
 - (C) The patient should be given broad-spectrum antibiotic therapy.
 - (D) This finding increases his mortality 10-fold.
 - (E) This CT finding is present in up to half the number of patients with acute pancreatitis and normally resolves without intervention.
- 16 A 76-year-old woman presents after a fall from standing height onto a countertop. She lands on the right side of her ribcage and complains of pain in that area and difficulty taking a deep breath. Vital signs are normal and physical examination is remarkable only for point tenderness in the right lateral fourth and fifth ribs. A chest x-ray done in the ED is normal.

Which of the following is the most appropriate next step in management?

- (A) Admit to the intensive care unit (ICU)
 - (B) Discharge home
 - (C) Discharge home with pain medication
 - (D) Discharge home with pain medication and incentive spirometer
 - (E) Discharge home with pain medication, incentive spirometer, and antibiotics
- 17 A 22-year-old woman presents to the ED with symptoms of extreme panic. She tells you that she just used lysergic acid diethylamine (LSD) for the first time. Which of the following is true regarding this patient?
- (A) Lorazepam may be used to reduce agitation.
 - (B) The patient is likely to get addicted to LSD.
 - (C) LSD is structurally and functionally similar to γ -aminobutyric acid (GABA).
 - (D) The lethal dose of LSD is very close to the typical dose taken to induce a "trip."
 - (E) The patient is unlikely to develop tolerance with repeated uses of LSD.
- 18 "Hard" findings of vascular injury mandating immediate angiography after trauma to an extremity include
- (A) Nonpulsatile hematoma.
 - (B) Palpable thrill.
 - (C) Associated peripheral nerve deficit.
 - (D) Diminished distal pulse.
 - (E) All of the above.
- 19 Which of the following effects is directly responsible for the QRS prolongation seen in tricyclic antidepressant poisoning?
- (A) Fast sodium channel blockade
 - (B) Potassium efflux blockade
 - (C) α -1 antagonism
 - (D) Anticholinergic activity
 - (E) Magnesium channel blockade
- 20 A 65-year-old man with multiple myeloma presents with generalized weakness and fatigue. His physical examination is unremarkable except for severe lassitude. Serum calcium level is 14 mg per dL. Which of the following is the most appropriate next step in management?
- (A) Magnesium sulfate
 - (B) Potassium phosphate
 - (C) Normal saline
 - (D) Vitamin D
 - (E) Hydrochlorothiazide

- 21 Cancer of which of the following organs is the most common cause of superior vena cava (SVC) syndrome?
- (A) Breast
 - (B) Lung
 - (C) Testicle
 - (D) Colon
 - (E) Thyroid
- 22 The absence of which of the following has almost 100% sensitivity. . .
- (A) Scrotal hematoma
 - (B) Penile hematoma
 - (C) Pelvic fracture
 - (D) Gross hematuria
 - (E) Rectal blood
- 23 A 44-year-old man presents after a motor vehicle crash (MVC) with scrotal pain. Blood was noticed initially at the urethral meatus, but a 16-Fr Foley catheter was mistakenly placed with return of yellow urine. Which of the following is the most appropriate next step in management?
- (A) Remove the 16-Fr catheter and place a 12 Fr Foley catheter.
 - (B) Remove the 16-Fr catheter and place a 12 Fr Coude catheter.
 - (C) Remove the 16-Fr catheter and perform retrograde urethrogram.
 - (D) Remove the 16-Fr catheter and perform retrograde cystogram.
 - (E) Leave the catheter in place and obtain urologic consultation.
- 24 Which of the following therapies has the fastest onset of action in reducing serum potassium levels in cases of hyperkalemia?
- (A) Calcium gluconate
 - (B) Calcium chloride
 - (C) Insulin and glucose
 - (D) Sodium polystyrene sulfonate (Kayexalate)
 - (E) Sodium bicarbonate
- 25 Rectal prolapse in children . . .
- (A) Is more common in girls.
 - (B) Usually occurs between the ages of 10 and 15.
 - (C) Usually involves all the layers of the bowel.
 - (D) May be a sign of underlying cystic fibrosis (CF).
 - (E) Should never be reduced in the ED.
- 26 A 38-year-old woman with a history of asthma presents to the ED with a chief complaint of wheezing and chest tightness typical of her asthma. She had recently run out of her medicines and complains of upper respiratory symptoms for the last one week. Accompanying her is her 6-year-old son and 72-year-old mother, both of whom have asthma. Which of the following summarizes the treatment differences of acute asthma exacerbations between these groups?
- (A) Corticosteroids are avoided in pediatric populations because of concerns about their effects on growth.
 - (B) The treatment of children with acute asthma exacerbations is similar to the treatment of adults and includes β -agonists, anticholinergics, and corticosteroids.
 - (C) Cromolyn sodium has a prominent role in the treatment of acute exacerbations of pediatric but not adult asthma.
 - (D) The first-line agent in treating elderly patients with acute asthma is ipratropium due to the high likelihood of underlying coronary artery disease and subsequent risk with β -agonist induced tachycardia.
 - (E) Leukotriene modifiers have recently been shown to be useful in acute asthma exacerbations in elderly but not pediatric or young adult patients.
- 27 The most common electrocardiographic (EKG) abnormality in patients with heatstroke is
- (A) Sinus bradycardia.
 - (B) Atrial fibrillation.
 - (C) QT interval prolongation.
 - (D) Ventricular fibrillation.
 - (E) Supraventricular tachycardia (SVT).
- 28 A 55-year-old man with diabetes presents with painful vision loss in his left eye, which occurred when he sat down to watch a movie in the theater. His acuity is markedly reduced in the left eye and his left pupil is poorly reactive to light and fixed at 4 mm. Which of the following is true regarding this patient's condition?
- (A) A unilateral shallow anterior chamber is diagnostic.
 - (B) Retinal venules demonstrate a characteristic boxcar appearance.
 - (C) Pilocarpine is typically administered to both eyes.
 - (D) Intravenous therapies are withheld until ophthalmologic evaluation is obtained.
 - (E) Ocular massage is a helpful temporizing measure.

- 29 Which of the following is true regarding psychogenic seizures?
- (A) Self-injurious behaviors such as urinary incontinence and tongue biting may occur.
 - (B) More than 50% of patients with psychogenic seizures may have a concomitant real seizure disorder.
 - (C) When turning the head of a seizing patient back and forth, patients with psychogenic seizures will avoid looking at the examiner.
 - (D) Patients with psychogenic seizures may demonstrate pelvic thrusting motions during their "seizures."
 - (E) All of the above.
- 30 Which of the following is the most common cause of death among nursing home residents?
- (A) Congestive heart failure
 - (B) Pneumonia
 - (C) Urosepsis
 - (D) Massive stroke
 - (E) Myocardial infarction
- 31 A 34-year-old woman presents with weakness, fatigue, rash, and fever for several days. She was prescribed an antibiotic by her primary care physician for an upper respiratory infection just before the symptoms started. The rash is diffuse, maculopapular, and confluent. Laboratory work demonstrates normal electrolytes, but an elevated creatinine at 3.6 mg per dL. Peripheral blood and urine contain eosinophils. Which of the following is the most likely etiologic agent?
- (A) Amoxicillin
 - (B) Doxycycline
 - (C) Clindamycin
 - (D) Azithromycin
 - (E) Erythromycin
- 32 A 47-year-old man is brought to the ED by ambulance after a motor vehicle accident. He was a restrained driver of a vehicle traveling 40 mph when he collided with a vehicle that turned in front of him. He vigorously "slammed" the brakes and locked his knee in an effort to stop the car. He is now unable to ambulate and he has an obviously deformed ankle. Initial x-rays reveal a pilon fracture. Which of the following structures might also be injured?
- (A) Calcaneus
 - (B) Femoral neck
 - (C) Lumbar spine
 - (D) Tibial plateau
 - (E) All of the above
- 33 The most reliable early indicator of shock in a pregnant patient after blunt abdominal trauma is
- (A) Hypotension.
 - (B) Elevated lactate.
 - (C) Tachycardia.
 - (D) Peritoneal signs on examination.
 - (E) Cool, clammy skin.
- 34 A 76-year-old woman presents to your ED in the middle of summer complaining of swelling of her ankles and feet. The daily high temperature has exceeded 100°F for the last 10 days. Which of the following is true?
- (A) She should be treated with furosemide.
 - (B) Her condition may resolve with acclimation.
 - (C) She should be treated with hydrochlorothiazide.
 - (D) An echocardiogram should be performed to exclude heat-induced congestive heart failure.
 - (E) Her condition is actually most common in the pediatric population.
- 35 A 57-year-old woman with a history of hypertension presents with headache. She describes acutely worsening global headache over the last 4 hours with nausea and vomiting. She admits to not taking any of her blood pressure medications for the last week. Vital signs are: T 98.4, HR 92, BP 220/130, RR 20, SpO₂ 97%. Examination reveals a patient in moderate discomfort, papilledema, hypertensive retinopathy, and a nonfocal neurologic examination. Laboratory studies, EKG, and noncontrast CT brain are all normal. Which of the following is the most appropriate next step in management?
- (A) Neurosurgical consultation
 - (B) Reduction of blood pressure by 25%
 - (C) Lumbar puncture
 - (D) Corticosteroids
 - (E) Noncontrast magnetic resonance imaging (MRI) of the brain
- 36 Which of the following is true regarding the management of epistaxis?
- (A) Silver nitrate sticks work best when activated by fresh bleeding.
 - (B) Silver nitrate sticks should not be used on bilateral surfaces of the septum.
 - (C) Avoid blowing the nose before placement of packing.
 - (D) Antibiotics are indicated in patients with posterior packs, but not anterior packs.
 - (E) Admission is indicated in patients with anterior packs, but not posterior packs.

37. Which of the following is true regarding traveler's diarrhea?
- (A) Prophylactic antibiotics are effective in reducing the incidence of traveler's diarrhea.
 - (B) *Campylobacter* has begun to develop widespread resistance to fluoroquinolone therapy.
 - (C) Routine antibiotic prophylaxis is not recommended for all travelers.
 - (D) Bismuth subsalicylate (Pepto-Bismol) taken four times daily reduces the incidence of traveler's diarrhea.
 - (E) All of the above.
38. Which of the following is true about *Pneumocystis carinii* pneumonia (PCP)?
- (A) Typical radiographic findings include bilateral lobar infiltrates, more commonly in the lower lobes.
 - (B) Among patients with acquired immune deficiency syndrome (AIDS), PCP, and respiratory failure requiring ventilation, patients who have been compliant with prophylactic trimethoprim-sulfamethoxazole (TMP-SMX) therapy before being diagnosed with PCP have a better outcome.
 - (C) Patients who have PCP without AIDS usually present with a more abrupt course of respiratory difficulty.
 - (D) Corticosteroids are of benefit in treating all patients with PCP, regardless of the severity of the illness.
 - (E) All patients with PCP require respiratory isolation.
39. Which of the following is the most common complication of diverticulosis?
- (A) Perforation
 - (B) Bleeding
 - (C) Obstruction
 - (D) Diverticulitis
 - (E) None of the above
40. Injury to which of the following is the most common cause of traumatic death in children?
- (A) Head
 - (B) Chest
 - (C) Abdomen
 - (D) Pelvis
 - (E) Femur
41. Which of the following conditions is the most common cause of lens dislocation?
- (A) Tertiary syphilis
 - (B) Homocystinuria
 - (C) Marfan syndrome
 - (D) Trauma
 - (E) Ehler-Danlos syndrome
42. Which of the following is true regarding treatment of acute lead toxicity?
- (A) Acute lead encephalopathy is generally self-limited and requires no specific therapy.
 - (B) Dimercaprol should be given before calcium disodium ethylenediamine tetraacetic acid (EDTA).
 - (C) Activated charcoal is the mainstay of GI decontamination.
 - (D) Succimer should be the first chelator given in patients with severe lead poisoning.
 - (E) Penicillamine is more effective than succimer in chelation of lead.
43. Which of the following is the most reliable physical examination test for evaluating thoracic outlet syndrome?
- (A) Arms abducted to 90 degrees, elbows flexed to 90 degrees, open and close fists for 3 minutes
 - (B) Arms abducted to 90 degrees, thumbs pointed down, resist adduction
 - (C) Dorsa of hands held against each other for 1 minute
 - (D) Repeated tapping of the volar wrist
 - (E) Pressure on the infraclavicular region for 1 minute
44. A 24-year-old woman presents with dysuria and increased frequency of urination for 2 days. She denies fevers, vomiting, or back pain. She is allergic to sulfa drugs and fluoroquinolones. Urinalysis demonstrates 25 WBCs per high-powered field, leukocyte esterase, and nitrites. Which of the following is the most appropriate antibiotic regimen?
- (A) Ciprofloxacin
 - (B) TMP-SMX
 - (C) Doxycycline
 - (D) Azithromycin
 - (E) Amoxicillin-clavulanic acid
45. Which of the following is true regarding prosthetic heart valves?
- (A) Bioprosthetic (porcine) valves require anticoagulation therapy with Coumadin.
 - (B) Prophylactic anticoagulation should be maintained at international normalized ratios (INRs) between 1 and 2.
 - (C) Chronic hemolysis occurs in most patients.

- (D) In patients with mechanical valves, auscultation of a metallic closure sound indicates serious valvular dysfunction.
- (E) Endocarditis develops in most patients.
- 46** Which of the following is true regarding pericardial effusion?
- (A) As little as 50 mL of pericardial fluid can cause abnormalities on the cardiac shadow on chest x-ray.
- (B) Beck's triad is seen in less than half the number of patients with signs of tamponade.
- (C) MRI is the diagnostic test of choice.
- (D) Blind pericardiocentesis is the treatment of choice for stable pericardial effusions.
- (E) Electrical alternans is the most common EKG abnormality.
- 47** Which of the following is true regarding Ludwig's angina?
- (A) Endotracheal intubation is the preferred method of airway control.
- (B) The mortality rate of Ludwig angina is approximately 75%.
- (C) Ludwig angina may occur in children without any preceding cause.
- (D) Extension to the retropharyngeal space is the most common cause of death.
- (E) In patients with an associated oral malignancy, radiation is the therapy of choice.
- 48** Which of the following is a risk factor for death in patients with asthma?
- (A) Usage of more than two canisters of albuterol per month.
- (B) History of prior intubation secondary to asthma.
- (C) History of prior ICU admission secondary to asthma.
- (D) Underappreciation of the severity of an exacerbation by the ED physician.
- (E) All of the above are risk factors for death from asthma.
- 49** Which of the following is indicated as supplemental treatment for patients with methanol poisoning?
- (A) Cobalamin
- (B) Folate
- (C) Niacin
- (D) Vitamin D
- (E) Vitamin K
- 50** A 52-year-old diabetic man presents to the ED with fever, crampy abdominal pain, and watery brown diarrhea. He recently completed a 14-day course of clindamycin, which was prescribed by his primary care doctor after she performed an incision and drainage of a small cutaneous abscess on his flank. The patient's symptoms started toward the end of his antibiotic therapy and he has been taking diphenoxylate "around the clock" since then without much benefit. Which of the following is true?
- (A) Stool culture is the gold standard.
- (B) The patient's diarrhea is an expected, minor side effect of his recent antibiotic therapy.
- (C) Diphenoxylate is probably contributing to this patient's current illness.
- (D) Colonoscopy is usually required for effective treatment.
- (E) Children affected by this illness tend to have milder disease.
- 51** Cholelithiasis is an uncommon disease entity in children. Which of the following is most commonly associated with biliary colic in children?
- (A) Cystic fibrosis (CF)
- (B) Hemolytic anemia
- (C) Obesity
- (D) Diabetes
- (E) Cerebral palsy
- 52** A 50-year-old man with a history of end-stage renal disease on peritoneal dialysis presents with abdominal pain. You suspect peritonitis as a cause of his pain. Which of the following is the minimum dialysis fluid WBC which would make the diagnosis of continuous ambulatory peritoneal dialysis (CAPD)-associated peritonitis?
- (A) 20 per mm³
- (B) 50 per mm³
- (C) 100 per mm³
- (D) 200 per mm³
- (E) 250 per mm³
- 53** Urine containing crystals suggests ingestion of which of the following substances?
- (A) Ethylene glycol
- (B) Methanol
- (C) Isopropanol
- (D) Salicylates
- (E) Acetaminophen
- 54** The clinical factor that best differentiates heat stroke from heat exhaustion is
- (A) Core temperature >102°F.
- (B) The presence of anhidrosis.
- (C) Elevation of hepatic transaminases.
- (D) Central nervous system (CNS) dysfunction.
- (E) History of exertion in a hot environment.

- 55 A 22-year-old woman presents to the ED after a domestic dispute with a boyfriend in which she was stabbed in the neck just lateral to her thyroid cartilage. Which of the following is an indication for mandatory operative exploration?

(A) Palpable thrill
(B) Subcutaneous emphysema
(C) Violation of the platysma
(D) Bruit upon auscultation
(E) All of the above

- 56 A 1-week-old infant is brought to the ED with central cyanosis. Pulse oximetry is 85% on maximal oxygen therapy, and chest x-ray is shown in Figure 4-4. Which of the following medications may be indicated in the treatment of this patient?

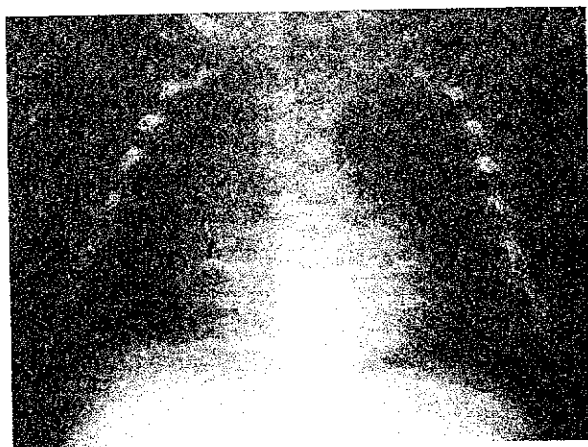


Figure 4-4.

(A) Prostaglandin E_1
(B) Albuterol
(C) Indomethacin
(D) Aspirin
(E) Ribavirin

- 57 A 45-year-old woman presents with a red eye on waking. She is completely asymptomatic other than this. She denies any past medical history and takes no medications. The eye is shown in the Figure 4-5. Physical examination is otherwise normal. Which of the following is the most appropriate next step in management?

(A) Emergent ophthalmologic consultation
(B) Platelet function assay
(C) Topical antihistamines
(D) Topical antibiotics
(E) No specific therapy



Figure 4-5.

- 58 Which of the following indicates a likely globe injury in a patient with an eyelid laceration?

(A) Vertical laceration through lid margin
(B) Horizontal laceration extending the length of the eyelid
(C) Fat protruding from laceration
(D) Lacerations with a large degree of tissue loss
(E) Stellate lacerations

- 59 A 64-year-old man with a history of hypertension presents to the ED with a painful rash on the right side of his back spreading to his trunk (see Fig. 4-6). Which of the following underlying diseases should be suspected?

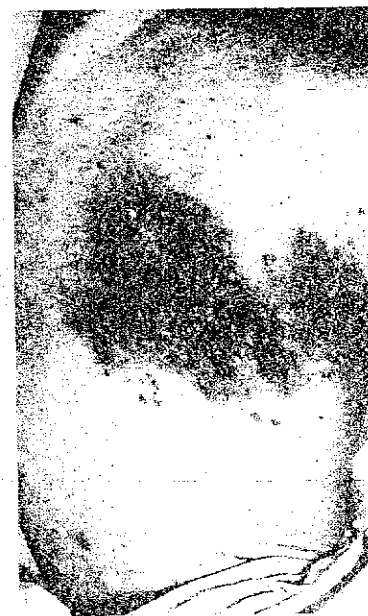


Figure 4-6. (See color insert.)

- (A) Chronic lymphocytic leukemia (CLL)
- (B) Human immunodeficiency virus (HIV)
- (C) Asplenia
- (D) Rheumatoid arthritis
- (E) He is most likely to be healthy.

- 60** A 24-year-old man presents with abdominal fullness. He is very nervous, but in no acute distress. Vital signs and physical examination are normal. An obstructive radiography series is ordered. Which of the following is the most appropriate next step in management (see Fig. 4-7)?

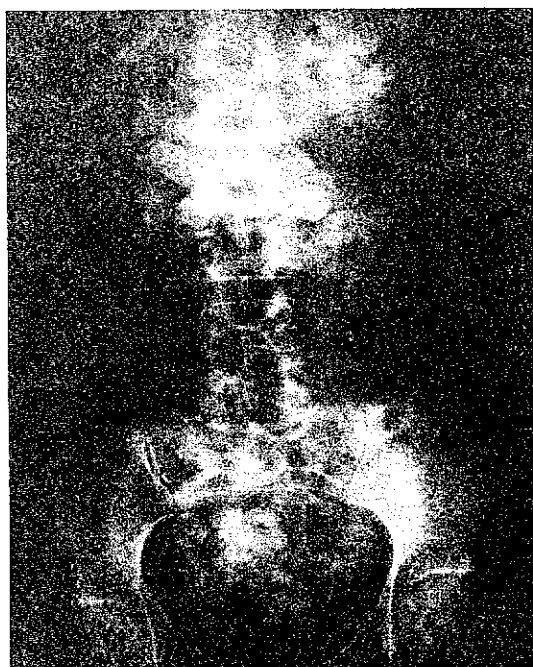


Figure 4-7.

- (A) MRI abdomen
 - (B) Surgery
 - (C) Polyethylene glycol
 - (D) Nasogastric (NG) aspiration
 - (E) Endotracheal intubation
- 61** A 45-year-old woman presents with headache and fatigue for 1 week. She reports intermittent diffuse headaches, which occur in different locations in her head and do not follow any predictable pattern. She has also noticed that she feels tired easily on her daily activities. Physical examination is normal except for temperature of 100.5°F and pale conjunctivae. She exhibits no meningismus. Laboratory work is as follows:

WBC: 8,000 cells per mm^3
Hemoglobin: 8.5 g per dL

Platelets: 15,000 cells per mm^3
Na: 135 mEq per L
K: 4.4 mEq per L
Cl: 100 mEq per L
 HCO_3^- : 24 mEq per L
Blood urea nitrogen (BUN): 24 mEq per L
Cr: 2.2 mEq per L
Glucose: 109 mEq per L

Which of the following is the most appropriate next step in management?

- (A) Platelet transfusion
- (B) Hemodialysis
- (C) Splenectomy
- (D) Plasmapheresis
- (E) Acyclovir

- 62** Which patients with a transient ischemic attack (TIA) and the following associated signs and symptoms are at lowest risk for recurrent TIA or future stroke?

- (A) Isolated monocular blindness (amaurosis fugax)
- (B) Aphasia and new-onset atrial flutter
- (C) "Crescendo" TIA (more than three ischemic events in 72 hours)
- (D) Left arm weakness in a patient who is already taking aspirin therapy
- (E) Left arm weakness and facial droop in a diabetic patient that persisted for 45 minutes

- 63** A 36-year-old pregnant female at 27 weeks' gestation presents to your community ED after a motor vehicle accident. The patient was a restrained passenger (three point restraints) in a vehicle traveling approximately 30 mph when it collided with a stationary vehicle. Air bags deployed, but the patient self-extricated and was found sitting next to the car at the scene. She has not had any vaginal bleeding or leakage, but she is complaining of painful contractions. Which of the following is true?

- (A) Uterine rupture has occurred.
- (B) The patient most likely has placental abruption.
- (C) Uterine contractions usually resolve spontaneously.
- (D) The patient should be started on a terbutaline infusion and immediately transferred to a tertiary care facility.
- (E) Digital examination should be performed to determine if there is cervical dilation and the patient is in active labor.

- 64** A pregnant woman at 37 weeks' gestation is undergoing tocographic and fetal monitoring in your ED after a motor vehicle accident (see Fig. 4-8). The obstetric nurses bring you a fetal strip for

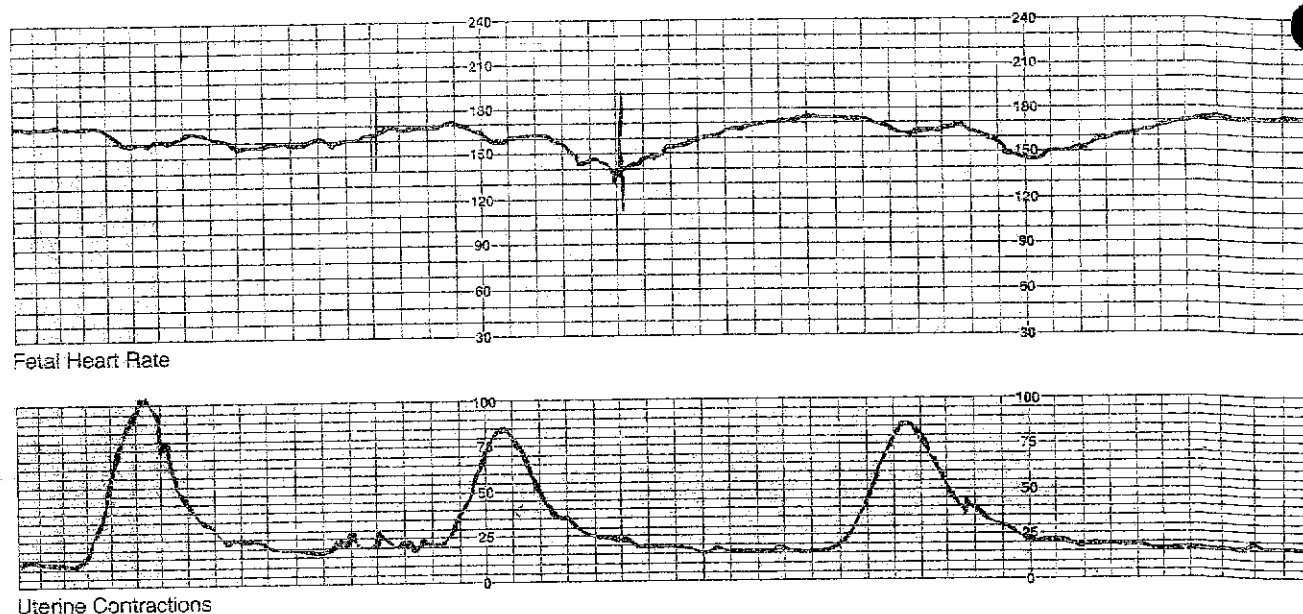


Figure 4-8.

interpretation. Which of the following is represented in the strips?

- (A) Head compression
- (B) Uterine rupture
- (C) Umbilical cord compression
- (D) Placenta previa
- (E) Uteroplacental insufficiency

65 Which of the following is true regarding concussions?

- (A) Loss of consciousness is required to meet the technical definition.
- (B) CT brain is acutely abnormal in half of all cases.
- (C) MRI brain is almost always abnormal acutely.
- (D) Postconcussive anosmia may be permanent.
- (E) Athletes should return to play as soon as possible after concussion to prevent brain atrophy.

66 The most common bacterial cause of diarrhea in patients seeking medical attention is

- (A) *Campylobacter* spp.
- (B) *Salmonella* spp.
- (C) *Shigella* spp.
- (D) *Escherichia* spp.
- (E) *Yersinia* spp.

67 A 45-year-old man presents with progressive scrotal pain for 3 days. He denies any swelling in the area, but reports mild dysuria. Physical examination

demonstrates tenderness in the epididymis, normal descended testes, and normal bilateral cremasteric reflexes. Which of the following is the most likely cause of the symptoms?

- (A) *Chlamydia*
- (B) *Neisseria gonorrhoeae*
- (C) *Escherichia coli*
- (D) Chemical epididymitis
- (E) Testicular torsion

68 Which of the following is the peak time for rotavirus infections?

- (A) Spring
- (B) Summer
- (C) Spring and summer
- (D) Spring and winter
- (E) Summer and winter

69 Which of the following correctly matches the clinical entity and its effects on phosphate metabolism?

- (A) Rhabdomyolysis causes hypophosphatemia.
- (B) Respiratory alkalosis causes hyperphosphatemia.
- (C) Hyperparathyroidism causes hyperphosphatemia.
- (D) Chronic renal insufficiency causes hypophosphatemia.
- (E) Treatment of diabetic ketoacidosis (DKA) causes hypophosphatemia.

- 70 What is the approximate sensitivity and specificity of the monospot test for EBV infectious mononucleosis?
- (A) 50%, 50%
 - (B) 80%, 80%
 - (C) 95%, 80%
 - (D) 80%, 95%
 - (E) 95%, 95%
- 71 A 56-year-old man with a history of a prosthetic aortic valve presents for evaluation of fever and chills for 1 week. Echocardiogram reveals vegetations on the prosthetic valve. Which of the following is the most likely etiologic organism?
- (A) Coagulase-negative *Staphylococcus*
 - (B) *Streptococcus viridans*
 - (C) *Haemophilus influenzae*
 - (D) *Pseudomonas aeruginosa*
 - (E) *Klebsiella pneumoniae*
- 72 Among children, which of the following is the most common cause of pancreatitis?
- (A) Biliary tract disease
 - (B) Trauma
 - (C) Alcohol
 - (D) Coxsackievirus infection
 - (E) Erythromycin toxicity
- 73 Which of the following is the most common symptom in patients with spinal cord compression?
- (A) Urinary retention
 - (B) Saddle anesthesia
 - (C) Motor weakness
 - (D) Bowel incontinence
 - (E) Ascending paresthesias
- 74 Which of the following neurologic findings is characteristic of tick paralysis?
- (A) Cranial nerve palsy
 - (B) Descending flaccid paralysis
 - (C) Ascending flaccid paralysis
 - (D) Decreased pain and temperature sensation
 - (E) Decreased vibratory and position sensation
- 75 A 42-year-old man is brought into the ED after being thrown from a train during a derailment. He is hypotensive but has no hemothorax, a normal mediastinum and no pelvic fracture. Focused assessment of sonography in trauma (FAST) scanning reveals hemoperitoneum. Which of the following is most likely injured?

- (A) Spleen
- (B) Kidneys
- (C) Liver
- (D) Diaphragm
- (E) Pancreas

- 76 A 25-year-old G₁P₀ presents at 18 weeks' gestation with a chief complaint of painless vaginal discharge (see Fig. 4-9). Her pregnancy has progressed normally to date. Speculum examination reveals an adherent whitish discharge with a pH of 6.0. There is no one available to interpret the microscopy so the laboratory asks you to look at it. Which of the following is true?

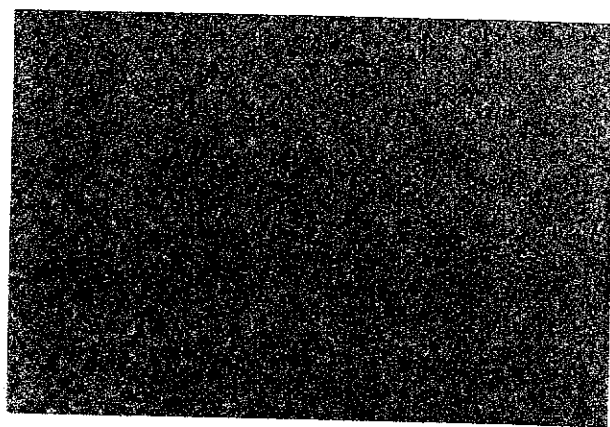


Figure 4-9.

- (A) Metronidazole is the treatment of choice.
 - (B) Amoxicillin should be used due to the patient's pregnancy.
 - (C) No treatment is required until the third trimester, after organogenesis has occurred.
 - (D) Treatment is elective, as the infection poses no health risks to the mother or fetus.
 - (E) None of the above.
- 77 A 65-year-old woman presents with lightheadedness. She denies chest pain or shortness of breath. Vital signs are 99.0°F, 160, 20, 144/75, 96% RA. The EKG is shown in Figure 4-10. Which of the following is the most appropriate next step in management?
- (A) Adenosine
 - (B) Diltiazem
 - (C) Amiodarone
 - (D) Cardioversion at 50 J
 - (E) Cardioversion at 200 J

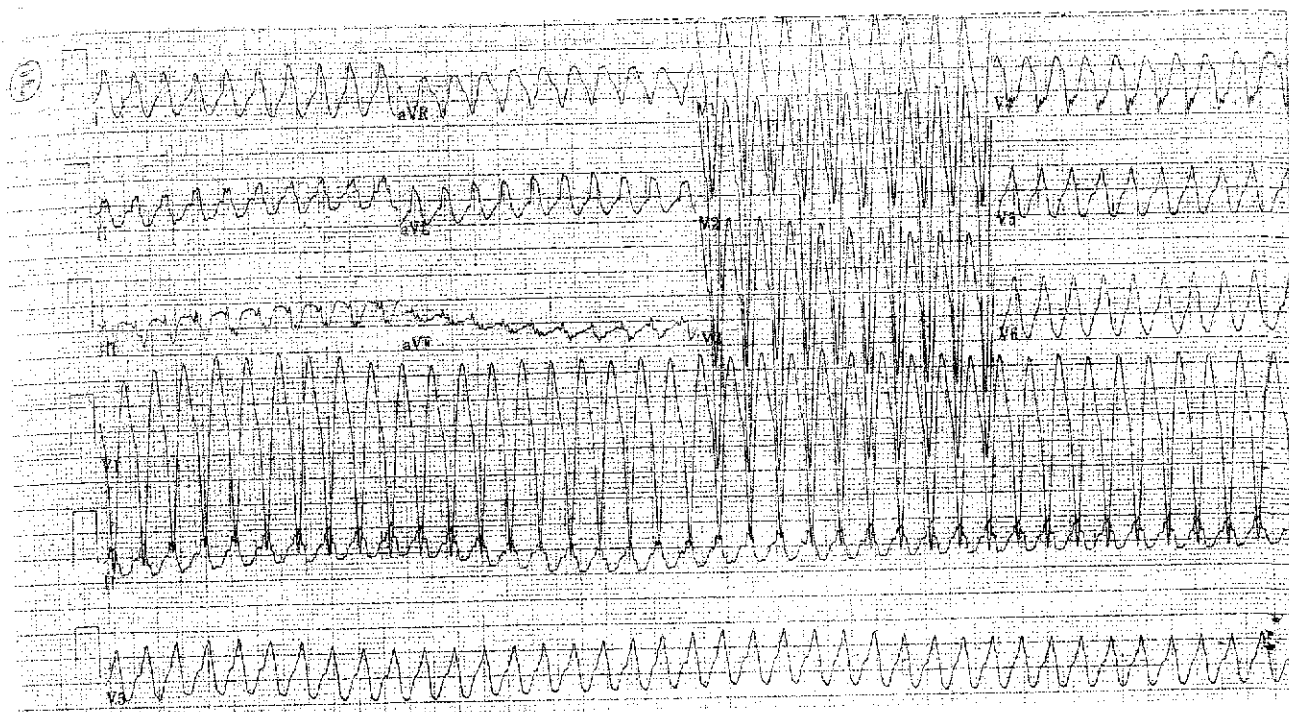


Figure 4-10. (See color insert.)

78 Which of the following sleeping positions is the best method to reduce the risk of sudden infant death syndrome (SIDS)?

- (A) Prone
- (B) Supine
- (C) Side
- (D) Standing
- (E) Head down

79 Which of the following may be a cause of central vertigo?

- (A) Basilar artery migraine
- (B) Vertebrobasilar artery insufficiency
- (C) Multiple sclerosis
- (D) Alcoholic cerebellar degeneration
- (E) All of the above

80 You are consulting the thoracic surgery service after having recently placed a chest tube in a 22-year-old man for a 25% spontaneous pneumothorax. The consultant asks you if there is still an "air leak" present. Assuming the patient's lung re-expanded appropriately, what is the most likely significance of an air leak?

- (A) All patients will have an air leak after chest tube insertion.
- (B) The chest tube was inserted into a branch of the patient's tracheobronchial tree.
- (C) The suction holes on the chest tube are not completely inserted into the chest cavity.

(D) The water seal chamber does not have enough water in it.

(E) There is still an unhealed defect in the patient's bronchial tree.

81 Which of the following is true regarding irritable bowel syndrome (IBS)?

- (A) It is more common in men than in women.
- (B) Pain associated with IBS is usually relieved with defecation.
- (C) IBS is a psychiatric diagnosis.
- (D) IBS is most commonly caused by unrecognized food allergies.
- (E) All of the above.

82 Which of the following is the gold standard for diagnosing choledocholithiasis?

- (A) CT scan of the abdomen with intravenous and oral contrast
- (B) Ultrasonography (US)
- (C) Cholescintigraphy (e.g., HIDA scan)
- (D) Endoscopic retrograde cholangiopancreatography (ERCP)
- (E) CT scan of the abdomen with intravenous contrast only

83 The primary risk factor for uterine rupture amongst pregnant women is

- (A) Vaginal delivery after a prior cesarian-section.
- (B) Diabetes.

- (C) Large for gestational age fetus.
 (D) Prolonged use of oxytocin.
 (E) Maternal collagen vascular disease.
- 24** A 23-year-old woman presents with fever, chills, and right flank pain. She just completed treatment for pyelonephritis with a 2-week course of ciprofloxacin. The patient states that the symptoms are very similar to when she had pyelonephritis, and she cannot understand why she did not get better with the antibiotics. She admits to having waited "longer than usual" before seeking care for the pyelonephritis during the first visit, but swears that she took all the antibiotics as directed. Which of the following is the most appropriate next step in management?
- (A) Continue ciprofloxacin for 3 more days
 (B) Continue ciprofloxacin for 7 more days
 (C) Start TMP-SMX for 3 days
 (D) Start metronidazole for 3 days
 (E) CT scan of the abdomen/pelvis
- 25** Which of the following oral medications is most likely to cause serious damage to the esophageal mucosa when swallowed?
- (A) Amoxicillin
 (B) Potassium chloride
 (C) Metoprolol
 (D) Lovastatin
 (E) Hydrochlorothiazide
- 26** A 6-month-old male infant is brought in by his mother after 4 days of continuous diarrhea. He appears mildly dehydrated on examination. Which of the following acid-base disturbances is likely to be present?
- (A) Elevated anion gap metabolic acidosis
 (B) Normal anion gap metabolic acidosis
 (C) Metabolic alkalosis
 (D) Respiratory acidosis
 (E) Respiratory alkalosis
- 27** Which of the following is the most specific finding in diagnosing necrotizing enterocolitis (NEC)?
- (A) Abdominal radiograph demonstrating multiple dilated loops of small bowel
 (B) Abdominal radiograph with a "double bubble" sign
 (C) Abdominal radiograph with pneumatosis intestinalis
 (D) The presence of abdominal distension, bilious emesis and guaiac positive stools
 (E) The presence of portal vein thrombosis upon US examination
- 28** A 32-year-old man presents to the ED with headache and fever for 2 days. He also reports a stiff neck and photophobia. Past medical history is unremarkable. Physical examination reveals a febrile patient with nuchal rigidity, no papilledema, and no focal neurologic deficits. Which of the following is the most appropriate next step in management?
- (A) Antibiotic therapy
 (B) Antibiotic therapy with corticosteroids
 (C) CT brain with IV contrast
 (D) MRI brain with gadolinium contrast
 (E) Discharge home with diagnosis of viral meningitis
- 29** A 4-year-old boy presents with generalized abdominal pain and multiple episodes of bloody diarrhea. His mother says he had a hamburger at a local fast food restaurant 5 days ago but that "they eat there all the time." The patient's illness started 1 day before seeing you. It began with watery diarrhea and mild abdominal pain but his symptoms have progressed to more severe pain with bloody diarrhea. He has no fever. Which of the following statements is true?
- (A) TMP-SMX is the treatment of choice
 (B) Up to 25% of children may develop hemolytic-uremic syndrome (HUS)
 (C) Most affected children have a very high fever
 (D) Thrombotic thrombocytopenic purpura is the most common systemic complication
 (E) The hamburger is likely unrelated to this patient's diarrheal illness as the incubation period is more commonly 12 to 24 hours
- 30** A 42-year-old healthy male experiences crampy abdominal pain and persistent, violent recurrent retching and vomiting 3 hours after eating a hamburger, corn and potato salad at a backyard picnic. Which of the following is true about his illness?
- (A) The disease is caused by rapid invasion of the intestinal mucosa
 (B) Antibiotics are instrumental in management
 (C) Most cases are caused by *Bacillus cereus*
 (D) A heat-stable toxin is responsible for his symptoms
 (E) This syndrome is the most common cause of acute food poisoning in the United States.
- 31** Which of the following is true regarding the treatment of peritonsillar abscess (PTAs)?
- (A) Emergency tonsillectomy totally prevents recurrence of PTAs.

- (B) Recurrent PTAs typically occur >1 year after the initial episode.
- (C) Antibiotic therapy is as effective as surgical incision and drainage.
- (D) Penicillin is the antibiotic of choice.
- (E) Recurrence of PTAs is more common in children than in adults.
- 92 Which of the following is a criterion for liver transplantation in acetaminophen overdose?
- (A) AST greater than twice normal
- (B) pH <7.30
- (C) PT prolongation >5 seconds
- (D) Ammonia >40 mg per dL
- (E) GGT >300 mg per dL
- 93 A 22-year-old primigravida presents to the ED with crampy low abdominal pain. She is 11 weeks by dates and denies any vaginal bleeding. Her physical examination reveals a normal vaginal vault and a closed internal cervical os. US examination reveals a single intrauterine gestation with a crown-rump length >20 mm corresponding to 9 weeks, with no fetal heart tones. Persistent failure to expel the fetal and maternal uterine contents would result in a
- (A) Threatened abortion.
- (B) Incomplete abortion.
- (C) Complete abortion.
- (D) Missed abortion.
- (E) Inevitable abortion.
- 94 A first-time mother brings her 9-day-old infant in with a chief complaint of seizures. The infant had an uncomplicated term delivery and has been well. Her infant has been and remains afebrile. Which of the following is the most likely cause of this infant's seizures?
- (A) Hypokalemia
- (B) Hyponatremia
- (C) Hypocalcemia
- (D) Hypomagnesemia
- (E) Maple syrup urine disease
- 95 A 24-year-old man presents with pain behind his right ear. He thought he had an ear infection 1 week before, and took two of his girlfriend's azithromycin pills without seeking medical attention. His ear pain improved transiently for a few days, but he began developing otalgia again with fevers. On examination, his temperature is 100.5°F, and he has significant right postauricular tenderness. His tympanic membranes appear normal bilaterally. Which of the following is the most common single pathogen implicated in this condition?
- (A) *Staphylococcus aureus*
- (B) *Staphylococcus epidermidis*
- (C) *Streptococcus pneumoniae*
- (D) *Streptococcus pyogenes*
- (E) *P. aeruginosa*
- 96 Which of the following medications is the most common cause of pill esophagitis?
- (A) Alendronate
- (B) Potassium chloride
- (C) Aspirin
- (D) Doxycycline
- (E) Captopril
- 97 A 45-year-old man presents after a motor vehicle collision with hypotension. His physical examination demonstrates clear lungs but an unstable pelvis. The pelvis is secured tightly with a bed sheet, but the patient continues to be hypotensive despite crystalloid and blood replacement. No other obvious source of hemorrhage is identified. Which of the following is the most appropriate next step management?
- (A) CT chest
- (B) CT abdomen/pelvis
- (C) CT brain
- (D) Angiography with embolization
- (E) Laparotomy
- 98 An 11-year-old boy hit the curb while riding his bicycle and was thrown forward into his handlebars. The classic injury associated with this accident is
- (A) Myocardial contusion.
- (B) Pancreatic injury.
- (C) Liver contusion.
- (D) Splenic contusion.
- (E) Diaphragmatic rupture.
- 99 Which of the following is characteristic of facial pain due to trigeminal neuralgia?
- (A) It is most commonly bilateral.
- (B) Attacks last for an average of 30 minutes.
- (C) Patients demonstrate partial facial nerve palsy on examination.
- (D) It most commonly involves the V2 and V3 branches of the trigeminal nerve.
- (E) Most patients have concomitant dental disease.

100 A 78-year-old male nursing home resident is brought to the ED with fever and hypoxia. He has a history of dysphagia and dysarthria secondary to stroke and receives tube feedings and small spoon feeds. Approximately 1 week before admission, he had an episode of vomiting and appeared to choke on some of the regurgitated contents. His chest x-ray now shows bilateral lower lobe infiltrates. He has a fever of 101.8°F, a WBC of 16,000 and a pulse

oximetry of 92% on room air. What is the most likely diagnosis and appropriate initial treatment?

- (A) Community-acquired pneumonia (CAP), levofloxacin, and corticosteroids
- (B) Aspiration pneumonia, metronidazole
- (C) Aspiration pneumonitis, no antibiotics
- (D) Aspiration pneumonia, aztreonam
- (E) Aspiration pneumonia, piperacillin-tazobactam

Answers and Explanations

- 1 Answer C. Trauma accounts for over half of all pediatric deaths in this country, with motor vehicle collisions as the most common mechanism and head trauma as the most common specific etiology. Child abuse accounts for up to one third of all traumatic deaths in some areas of the country. Malignancy and congenital abnormalities are the next most common causes of death in the United States. Respiratory and GI infections are the most common causes of pediatric death worldwide. Stroke is an extremely uncommon cause of death in children, but is a leading cause in adults.
- 2 Answer E. Atopic dermatitis is a chronic inflammatory skin disease that is characterized by intense pruritus and an eczematous rash. There is no classic lesion in atopic dermatitis. The disease may initially manifest itself with erythematous papules or vesicles, with diffuse erythema and frequently contains a weeping exudate. Over time, dryness, scaling, and lichenification predominate. Although there is no typical lesion, there are many classic features of atopic dermatitis. Pruritus is the hallmark of the disease and is typically intense. In adults, the disease has a predilection for the flexural creases such as the anterior elbow, ankle, and neck as well as the posterior knee. In contrast, in infants the disease is characterized by dry, red, scaly involvement of the cheeks. The chin is also commonly involved and chin inflammation may be more severe due to the added irritation from drooling. Involvement of the hands is extremely common in adults and is frequently exacerbated by occupational exposures.
- 3 Answer B. With the possible exception of elderly patients older than 75 to 80 years old, the annual incidence of pneumonia in children under five years old is higher than at any other time of life. *M. pneumoniae* is the most common cause of community-acquired pneumonia (CAP) in "school-aged children," 5 to 15 years old as well as in young adults. The most common causes of pneumonia in the neonate, from birth to 3 weeks, are group B *Streptococcus*, gram-negative enterobacteria (e.g., *E. coli*), and *Listeria monocytogenes*. Such infections are uncommon, but can be severe when present. Between the ages of 3 weeks and 3 months, *Chlamydia trachomatis* is most common (i.e., not *Chlamydia pneumoniae*) followed by *S. pneumoniae*. Between 4 months and 4 years, viral pneumonias (e.g., respiratory syncytial virus (RSV), parainfluenza virus, influenza, adenovirus, rhinovirus) as well as *S. pneumoniae* are the most common causes. Increasingly, *C. pneumoniae* is thought to be a common cause of pneumonia in children aged 5 to 15 years, although *Mycoplasma* remains the chief cause of pneumonia in this group. It is no easier to differentiate between typical and atypical pneumonia in a pediatric population than in adults. Studies have demonstrated that the presence of symptoms that may suggest a viral etiology to pneumonia such as rhinorrhea, myalgias, or an illness in a family member do not help to determine the cause of pneumonia. The use of the pneumococcal conjugate vaccine is likely to drastically reduce the role of *S. pneumoniae* as a cause of disease.
- 4 Answer E. The decision about when to resume feeding and what patients should be allowed to eat is a matter of ongoing controversy. In the past, all patients underwent continuous nasogastric (NG) suctioning or were kept NPO. Currently, the only indication for NG suctioning is intractable vomiting or ileus. Some studies suggest that early enteral nutrition may actually improve outcomes. Laboratory and radiographic evidence of pancreatitis is likely to persist until patient discharge so these are not useful guides for resuming feeding. Many authors now recommend that enteral feeds should be started as soon as a patient is able to tolerate them. Although there is a dearth of evidence regarding the composition of feeds, it is known that pancreatic secretions decrease as carbohydrate composition exceeds 50% of the caloric content of the diet. Therefore, it makes sense to start with a low calorie, carbohydrate-rich diet, and steadily increase both the caloric and fat content of the diet over a period of days.
- 5 Answer D. To get a more accurate estimate of the actual number of WBCs in the CSF, the following formula should be used: $([\text{CSF RBC}] \times [\text{blood WBC}]/[\text{blood RBC}])$.
- 6 Answer A. Diagnosis of aspirated foreign bodies relies on plain radiographs. posteroanterior (PA)/lateral chest x-rays and anteroposterior (AP) and lateral soft tissue neck films are diagnostic in the case of radiopaque esophageal and tracheal foreign bodies. Esophageal foreign bodies are seen "en face" in AP views and on edge in lateral views, whereas the opposite is true for tracheal foreign bodies. Frequently, both the AP and lateral views will be needed

to determine the exact location of the foreign body. Additionally, the patient may present with ongoing symptoms that provide further clues to the location of the foreign body. Such symptoms include dysphagia, odynophagia, or regurgitation of food in the setting of esophageal obstruction, or stridor, wheezing, or generalized respiratory distress in the case of tracheal foreign bodies. (Figure reprinted with permission from Fleisher GR. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003.)

Answer E. To avoid obtaining x-rays demonstrating a falsely widened retropharyngeal space, lateral neck x-rays should be taken with full extension (cervical lordosis should be visible), and during inspiration. Although there are several criteria or rules, the most common rule is that the prevertebral space should be no wider than the width of the vertebral body behind it. Specifically, the anteroposterior width of the prevertebral soft tissue should be ≤ 7 mm at the level of C2 (from the anteroinferior border) and <14 mm at the level of C6 in kids, and 22 mm at C6 in adults. Because retropharyngeal abscesses are most common in children younger than 4 years old, compliance with extension films during inspiration is difficult to achieve. CT scanning can resolve this difficulty although sedation (which carries its own risks) may be required.

Answer B. The large majority of kidney stones <5 mm will pass spontaneously without the need for lithotripsy or surgical extraction. The large majority of stones >5 mm will *not* pass spontaneously. Stones may become stuck in several areas along the urinary tract—renal calyx, ureteropelvic junction, midureter at the iliac vessels, ureterovesicular junction, and vesical opening. Urologic management of kidney stones is through extracorporeal shock wave lithotripsy, percutaneous nephrolithotomy, or surgical extraction. Pain and nausea are potential indications for admission of patients with kidney stones, but are not independently associated with low passage rate. Age of the patient and composition of the stone are not directly associated with passage of the stone.

Answer C. The most common symptoms of hypocalcemia are neurologic and generalized irritability such as twitching and paresthesias which may progress to frank tetany, perioral paresthesias, as well as Chvostek's and Trousseau's signs. Chvostek's sign is a twitch of the upper lip when the area around the facial nerve is tapped. Trousseau's sign is carpopedal spasm when a blood pressure cuff is inflated over the arm at greater than systolic blood pressure for longer than 3 minutes. The other signs and symptoms listed are all manifestations of hypercalcemia.

10 Answer D. Nasogastric (NG) tubes are useful in determining the origin of bleeding. In patients who give a history of hematemesis, coffee-ground emesis, or melena, placement of an nasogastric tube (NGT) is generally not necessary and rarely yields useful information. Likewise, in patients who give a history of bright red blood-streaked stools, bleeding can be presumed to be of rectal origin. However, roughly 11% of patients with reddish stools or frank rectal blood have an upper gastrointestinal (UGI) source of bleeding. Because UGI bleeds tend to be more deadly (especially in cases in which patients present with reddish stools indicating rapid transit and a large volume of blood loss), an NGT is indicated in patients with rectal bleeding of uncertain cause to explore the UGI tract for diagnostic purposes. The presence of clear bile in the aspirate either indicates that the bleeding has stopped or that it did not originate from the UGI tract (the mere absence of blood is less definitive). There is no evidence that placement of an NGT in the setting of known esophageal varices or Mallory-Weiss tears worsens or triggers hemorrhage.

11 Answer A. Ethylene glycol is metabolized to glycoaldehyde by alcohol dehydrogenase, and glycoaldehyde is converted to glycolic acid by aldehyde dehydrogenase. Glycolic acid is then converted to glyoxylic acid, which is converted to oxalic acid. Oxalic acid binds calcium and forms calcium oxalate crystals, which can precipitate in the renal tubules, brain, and lungs, causing necrosis. Approximately one third of patients with ethylene glycol poisoning have hypocalcemia, which can lead to QT prolongation and seizures. Hyperkalemia is more common than hypokalemia, probably due to the metabolic acidosis caused by ethylene glycol poisoning. Anemia, thrombocytopenia, and hypermagnesemia do not usually occur in patients with ethylene glycol poisoning.

12 Answer B. This patient's x-ray demonstrates the classic "thumb" or "thumbprint" sign signifying a swollen epiglottitis. Although nasopharyngoscopy (NP) is an alternative to diagnose epiglottitis through direct visualization, patients with respiratory distress are not candidates for NP until a secure airway is established. Therefore, the lateral soft tissue neck x-ray will continue to have a role in supporting a diagnosis of epiglottitis. *H. influenzae* is the most common organism causing adult epiglottitis. However, only a minority of throat cultures are positive, suggesting a possibly significant role for viruses as an etiology as well. Patients with epiglottitis may subsequently develop an epiglottitis abscess, in which case, *Streptococcus* and *Staphylococcus* are the

most common isolated species. Although there is no age or seasonal prevalence, men and smokers are most commonly affected. The clinical course is variable, as epiglottitis is frequently preceded by a prodrome resembling a mild upper respiratory infection. In patients who have a brief prodrome with rapid progression of their symptoms, airway complications are more common. Symptoms of epiglottitis include fever, dysphagia, odynophagia, sore throat, and a muffled voice although fever may be absent in up to 50% of patients. Patients frequently have throat pain out of proportion to their physical findings on examination. This can be an important clue in diagnosis, as epiglottitis should be suspected in any patient in whom you expect to find severe tonsillopharyngitis on examination, and yet find a relatively benign-appearing oropharynx. Up to one third of patients with adult epiglottitis were seen within 48 hours before admission with symptoms that were mistaken for another entity, usually pharyngitis. On x-ray, an retropharyngeal abscess (RPA) is diagnosed by prominent swelling of the prevertebral tissues. To avoid artifactual effects as a result of redundant tissue, lateral neck films should be taken at full extension with deep inspiration. The retropharyngeal space will appear erroneously enlarged if x-rays are taken in expiration and flexion. RPA should be suspected if the prevertebral soft tissue from the anteroinferior aspect of C2 to the border of the tracheal air column is >7 mm in children and adults or the same space at the level of C6 is >14 mm in children and 22 mm in adults. Peritonsillar abscess (PTA) is a diagnosis that is typically made on physical examination. A CT may be necessary in cases that are unclear but a lateral neck x-ray generally contributes little to the diagnosis. Bacterial tracheitis is uncommon in adults. Lateral neck films may reveal narrowing of the tracheal air column below the level of the glottis, or a ragged posterior tracheal margin. Finally, patients with Ludwig's angina are usually diagnosed clinically, although lateral neck films will support the diagnosis and show prominent submandibular soft tissue swelling.

- 12 Answer A. Serologic tests are cheap, fast, reliable, and yield nearly the same sensitivity and specificity as biopsy specimens. Serologic testing is useful in those patients who have not had a documented prior history of *H. pylori* infection. Therefore, serologic testing seems reasonable to use in ED patients presenting with symptoms consistent with peptic ulcer disease. Serologic tests are not useful for monitoring the success of eradication therapy. Urea breath testing and stool antigen testing are other noninvasive tests are useful for the diagnosis of

H. pylori. Urea breath testing involves ingestion of radiolabeled urea that is then cleaved by the urease enzyme present in *H. pylori* yielding carbon dioxide and urea. These products are absorbed into the blood and the radiolabeled carbon dioxide is excreted by the lungs and detected in expired air. It is the test of choice for confirmation of eradication but has the small downside of prolonged, low-level radiation exposure in the setting of ^{14}C , or the need for additional specialized equipment in the case of ^{13}C . Stool antigen testing is a newer, promising noninvasive test but has yet to establish consistent results. Obtaining biopsy specimens and performing the rapid urease test both require invasive endoscopy to obtain tissue samples.

- 13 Answer A. Malaria is caused by the *Plasmodium* parasite, which is transmitted to humans through bites from the female *Anopheles* mosquito. *Plasmodium falciparum* has the capacity to cause severe systemic malaria, cerebral malaria, and blackwater fever, a syndrome of hemoglobinuria associated with chronic infection. Human-to-human transmission is rare and generally occurs only with blood transfusion or organ transplantation. Malaria is suspected in patients who travel to an endemic area and develop symptoms of fever, chills, headache, abdominal pain, nausea, and myalgias. Episodic fevers at a regular frequency is classic for malaria. Diagnosis involves thick blood smears to identify *Plasmodium* and thin smears to identify the specific organism. Treatment is with oral quinine plus doxycycline or intravenous quinidine.
- 14 Answer E. The CT scan reveals a hypodense fluid collection surrounding an inflamed pancreas. An acute fluid collection is associated with acute pancreatitis in 30% to 50% of patients. These fluid collections resolve spontaneously in most patients. A pseudocyst is a fluid collection that persists for 4 to 6 weeks and becomes encapsulated by a wall of fibrous or granulation tissue. Unless pancreatitis is due to an infectious agent, acute infection of fluid collections or of necrotic pancreatic tissue is uncommon. Infection usually occurs within the first 2 weeks although abscess formation may not occur until 1 month after the acute infection. If an abscess does occur, urgent drainage is required. (Figure reprinted with permission from Harris JH. The radiology of emergency medicine, 4th ed. Lippincott Williams & Wilkins; 1999:618.)
- 15 Answer L. Elderly patients with even mild blunt chest trauma are at high risk for pulmonary complications, including atelectasis, delayed contusion, infection, and ARDS. Aggressive pain management

and pulmonary toilet is mandatory for these patients to maintain proper lung expansion in order to prevent the complications mentioned earlier. Most patients are successfully managed on an outpatient basis—admission is indicated if the patient already has indications of pulmonary injury, such as abnormality on chest x-ray, hypoxia, or severe symptoms. Prophylactic antibiotics are not recommended in the absence of clinical and radiographic findings of infection.

17 Answer A. LSD is part of a class of substances known as *psychedelics*, which produces hallucinations, generally without confusion or disorientation. Users are usually aware that they are experiencing drug-induced hallucinations. Panic and agitation are the most common unintended effects of these substances—benzodiazepines are indicated as first-line therapy, along with placement in a low-stimulation atmosphere (dark, quiet room). Addiction to LSD is rare, but tolerance occurs with repeated use. LSD is structurally and functionally similar to serotonin. The lethal dose of LSD far exceeds the typical hallucinogenic dose and lethal overdoses are rare and usually due to contaminants, such as phencyclidine or cocaine.

18 Answer B. “Hard” signs of vascular injury are signs that strongly suggest the presence of vascular injury. They include an expanding hematoma, pulsatile blood loss, a palpable thrill, or audible bruit and any combination of the “six P’s” indicative of distal limb ischemia (pain, pallor, pulselessness, paresthesias, paralysis and poikilothermia [cool to touch]). Clinical “soft” signs provide less definitive evidence of vascular injury but mandate nonurgent evaluation. They include a nonpulsatile hematoma, an associated peripheral nerve deficit (due to the proximity of nerves to vascular structures in the neurovascular bundle), and a diminished distal pulse. A decreased ankle-brachial index (ABI) is also sometimes cited as a sign of lower extremity vascular injury, but its diagnostic utility is controversial.

19 Answer A. Tricyclics block fast sodium channels, slowing phase zero myocardial depolarization and causing QRS prolongation. Negative inotropy occurs due to reduced numbers of opened calcium channels. Potassium efflux blockade causes QT prolongation from impaired repolarization, α -1 antagonism causes hypotension, and anticholinergic effects cause tachycardia, hyperthermia, urinary retention, and agitation. Tricyclics have no known effect on magnesium channels.

20 Answer C. Hypercalcemia is extremely common in cancer patients and is probably the most common type of severe metabolic abnormality in this population. Mechanisms include direct bone destruction with release of calcium into the serum as well as PTH-like hormones secreted by some tumors. Symptoms of hypercalcemia include fatigue, nausea, vomiting, altered mental status, and abdominal pain. Treatment involves urgently lowering the serum calcium level with either oral hydration in mild cases or intravenous saline hydration with optional furosemide therapy. Bisphosphonates may also be used when the calcium level is extremely elevated. Magnesium sulfate may be given in patients with concomitant hypomagnesemia, but is not indicated for solitary hypercalcemia. Although hypokalemia commonly accompanies hypercalcemia (and is often exacerbated by therapies which lower calcium levels), phosphate salts should be avoided for hypercalcemia, as they may cause precipitation of calcium phosphate. If potassium levels are borderline or low, potassium chloride should be used for replacement while calcium levels are being lowered. Vitamin D and hydrochlorothiazide both increase serum calcium levels and are contraindicated in patients with hypercalcemia.

21 Answer B. SVC syndrome refers to obstruction of the SVC, usually by a neoplastic cause, of which lung cancer is the most common. Breast and testicular cancer are less common causes of SVC syndrome. Colon and thyroid neoplasms are uncommon causes. Symptoms include facial and upper extremity edema, shortness of breath, cough, and chest pain. Diagnosis is made by physical examination, chest x-ray, and advanced imaging such as echocardiography, CT, and/or MRI. Management has traditionally involved radiation therapy, but chemotherapy and surgical evaluation have potential roles in the acute treatment as well.

22 Answer D. Patients without gross hematuria on initial urine output after trauma almost never have bladder rupture. Only certain patients with pelvic fractures and microscopic hematuria can have bladder ruptures without the presence of gross hematuria. Bladder rupture can occur with either blunt or penetrating trauma and does not require the presence of a concomitant pelvic fracture. Retrograde cystography is used to evaluate suspected bladder injury, but must be performed only after urethral injury has been adequately ruled out. Extraperitoneal bladder rupture is usually managed conservatively with Foley catheter urine drainage

alone. Intraperitoneal bladder rupture almost always requires nonemergent surgical repair.

23 Answer E. Urethral injury occurs most commonly in men due to the length of the male urethra. The injury is suspected on physical examination by a variety of findings—blood at the urethral meatus, scrotal/penile hematoma, severe pelvic fracture, or high-riding or mobile prostate. Evaluation of suspected urethral injury generally involves retrograde urethrogram to assess for extravasation of contrast. However, once a Foley catheter is successfully placed and drained the bladder of urine, it should not be removed until urologic consultation is obtained. The key to managing urethral injuries is to prevent urine from leaking out of the bladder into the retroperitoneum, pelvis, or abdomen. If the Foley has already successfully decompressed the bladder, the urethral injury may be evaluated later in the operating room or with a modified bedside urethrogram around the Foley, if needed. Removal of the Foley can convert a partial urethral disruption into a complete one and should be avoided.

24 Answer E. Hyperkalemia predisposes patients to serious dysrhythmias. The management of hyperkalemia involves all of the answer choices given in the preceding text. Sodium bicarbonate begins to function in approximately 10 minutes to move potassium ions from the blood into the intracellular space, thereby reducing measurable (but not total body) potassium. Calcium salts, although effective within 5 minutes, do not reduce potassium levels—they function to stabilize the cardiac myocyte membrane to prevent the deleterious effects of hyperkalemia. Insulin and glucose begin to work in 30 minutes, and Kayexalate starts to exchange sodium for potassium in 1 hour. Albuterol, another therapy to reduce extracellular potassium, works in approximately 30 minutes, but is less effective than the other therapies. Hemodialysis is the management of choice in cases of hyperkalemia that are refractory to the medical management given in the preceding text.

25 Answer D. Rectal prolapse in children is typically incomplete, involving only the mucosal layer of bowel. It is more common in boys and usually occurs by the age of 2. It may be a sign of malnutrition or underlying cystic fibrosis (CF). Reduction should be attempted in the ED, although sedation may be required.

26 Answer B. Fortunately for emergency medicine physicians, management of acute asthma exacerbations is consistent across age-groups. The foundation of effective management of acute asthma

exacerbations is the concomitant administration of systemic corticosteroids, β -agonists (albuterol) and frequently ipratropium as an adjuvant therapy. Cromolyn sodium has no role in the management of acute asthma exacerbations. It works by inhibiting the release of inflammatory mediators from mast cells through chlorine channel blockade (also known as a *mast cell stabilizing agent*) and is used to prevent inflammation in long-term management. There is limited data that suggests that leukotriene receptor antagonists (e.g., montelukast, zafirlukast) are beneficial in the treatment of patients with acute asthma exacerbations who fail initial β -agonist therapy. Until further studies are done, however, leukotriene modifiers are not currently recommended for acute asthma management.

27 Answer C. QT interval prolongation is the most common EKG abnormality in patients with heat-related illness. Interestingly, QT interval prolongation is also very common in patients with hypothermia. Other common EKG findings include sinus tachycardia, atrial fibrillation, supraventricular tachycardia (SVT), right bundle branch block, and occasional ST segment changes. Sinus bradycardia and ventricular fibrillation do not commonly occur.

28 Answer C. The patient has acute angle closure glaucoma. The history of ambient light suddenly decreasing and forcing rapid pupillary dilatation is classic. Patients with glaucoma may often complain of headache, nausea, vomiting, and abdominal pain without any specific ocular symptoms. Bilateral shallow anterior chambers are the specific anatomic abnormality predisposing to closure of aqueous outflow—pilocarpine is therefore administered to both eyes (either eye has an equal chance of being affected by the acute angle closure). Boxcar retinal venules are characteristically seen in central retinal artery occlusion. Although emergent ophthalmologic consultation is required, all modalities for treatment of a severe glaucoma attack should be initiated early—pilocarpine, timolol, apraclonidine, prednisolone, acetazolamide, and mannitol. Intravenous medications may be withheld if intraocular pressures are not severely elevated. Sedatives and antiemetics are used as needed. Ocular massage is absolutely contraindicated, as this will increase intraocular pressure.

29 Answer E. It may be very difficult and occasionally impossible to differentiate patients with psychogenic seizures from patients with a true seizure disorder. However, patients with psychogenic seizures tend to have several distinctive clinical features. Interestingly, self-injurious behaviors such as urinary incontinence

and tongue biting may occur in patients with psychogenic seizures and are therefore not helpful in differentiating these patients from patients with a true disorder. Fecal incontinence is uncommon. Most problematic, perhaps, is that up to 58% of patients with psychogenic seizures may also have a concomitant real seizure disorder. Patients with psychogenic seizures also demonstrate avoidance behaviors (e.g., eyes forced shut, would not allow hand to be dropped on their face), have "out-of-phase" movements of their extremities and frequently demonstrate either forward or backward pelvic thrusting. Patients with true seizures typically have in-phase extremity movement (synchronous contraction of their extremities) rather than the thrashing movements of patients with psychogenic seizures. Finally, patients with psychogenic seizures demonstrate "geotropic" eye movements. This refers to the tendency of patients with psychogenic seizures to persistently turn their gaze away from the examiner whenever the patient's head is turned.

30 Answer B. Pneumonia is the most common cause of death among residents of long-term care facilities. It is also the most common reason for transfer to such a facility. As with many other diseases, the clinical presentation of pneumonia in the elderly may be very vague or atypical. Frequently, elderly patients may lack fever, cough, chest pain, headache, and myalgias. They may also not be strong enough or oriented enough to vocalize complaints about dyspnea. Studies have revealed that in general, elderly persons manifest fewer overall symptoms than do their younger cohort in the setting of pneumonia. *S. pneumoniae* remains the most common pathogen in both community-acquired pneumonia (CAP) and in pneumonia acquired in a nursing home setting. Although the etiology of nursing home-acquired pneumonia is often undetermined, the microbiology more closely resembles community-acquired pneumonia than nosocomial pneumonia. Interestingly, the risk of invasive pneumococcal disease is fourfold higher in the nursing home population than in elderly persons living in the community. Although its efficacy has not been 100% validated, most authors agree that all patients of long-term care facilities should be vaccinated against both influenza and *S. pneumococcus*.

31 Answer A. The onset of renal insufficiency, serum sickness-like signs and symptoms, and eosinophilia points to allergic interstitial nephritis as the most likely cause. A hypersensitivity reaction to various drugs is the usual cause—penicillins, nonsteroidal anti-inflammatory drugs (NSAIDs), sulfa

drugs, phenytoin, and diuretics are most commonly implicated. Macrolides and tetracyclines are less often involved. Interstitial nephritis may also be due to infectious and immunologic causes. Urinalysis generally demonstrates sterile pyuria with possible hematuria and mild proteinuria. Eosinophilia occurs in approximately half the number of patients. Definitive diagnosis is by kidney biopsy. Renal insufficiency due to allergic interstitial nephritis is usually reversible, and treatment always involves removal of the offending drug.

32 Answer E. Pilon fractures are frequently comminuted fractures of the tibial plafond (the distal articular surface of the tibia) associated with high-energy trauma. They most commonly occur due to axial loading after a fall in which the force of the fall is transmitted through the calcaneus and talus to the tibial plafond (sometimes referred to as a *hammer fracture*). Owing to the axial nature of these injuries and the high energy involved, other structures of the axial skeleton are at risk for injury as well, including all of the listed structures. Therefore, a thorough physical examination should be performed to evaluate for tenderness in these areas.

33 Answer B. Signs and symptoms of shock may be misleading in the pregnant trauma patient. Acid-base abnormalities such as decreased bicarbonate, or elevated lactate or base deficit are the earliest indicators of maternal shock. Due to an increased intravascular volume, pregnant patients will often not develop hypotension or tachycardia until significantly more blood volume is lost than their non-pregnant peers. Thus, early crystalloid administration is indicated to sustain the patient's increased blood volume and avoid fetal hypoperfusion. If blood loss occurs more gradually, a pregnant woman can lose as much as 35% of her blood volume before the development of blatantly abnormal vital signs. Additionally, because of the physiologic decrease in peripheral vascular tone during pregnancy, pregnant patients in shock may remain warm and dry even in the setting of shock. Finally, abdominal examination is less sensitive in pregnant patients. As many as 50% of pregnant patients with hemoperitoneum will not have peritoneal signs on physical examination. Therefore, ED physicians need to maintain a high suspicion for injury and a low threshold for further diagnostic testing.

34 Answer B. Acclimation or acclimatization is a collection of physiologic changes that occur in response to repeated heat stress. Physiologic changes typically occur over a 7- to 14-day period presuming consistent, daily exposure. Physiologic changes include increased plasma volume, a lower threshold for

sweating (earlier onset), increased rate and volume of sweating with decreased electrolyte content of sweat, increased aldosterone secretion, decreased heart rate and increased capacity for peripheral vasodilation. This patient has heat edema, which is a benign condition most commonly seen in the elderly and in nonacclimatized individuals. It is thought to be due to a combination of orthostatic pressure and vascular leak. Diuretic therapy is not beneficial and may cause dehydration. Although a minimal workup for other common conditions resulting in lower-extremity edema may be necessary, an echocardiogram is not required. Generally, heat edema resolves with acclimation or upon return to a patient's baseline climate, and may be treated with simple measures such as leg elevation and support stockings.

- 33 Answer B. The patient has hypertensive encephalopathy. The history of acute headache with vomiting and severely elevated blood pressure is characteristic. Neuroimaging with CT scan is often normal. The treatment is immediate reduction of blood pressure by as much as 30%. By definition, hypertensive encephalopathy is reversible when blood pressure is reduced. Neurosurgical consultation may be indicated later in the course, but blood pressure management should be instituted early. Lumbar puncture would be contraindicated in this circumstance, due to the papilledema indicating increased intracranial pressure. Corticosteroids are indicated in cases of temporal arteritis, which is on the differential diagnosis, but is far less common than hypertensive encephalopathy and requires the presence of an elevated erythrocyte sedimentation rate (ESR). MRI of the brain can add important structural information, but is not indicated emergently.

- 34 Answer B. Silver nitrate sticks should not be applied to both sides of the septum to avoid possible septal perforation. Silver nitrate sticks will not work if active bleeding is present. They are best reserved for raw areas of nasal mucosa to which topical vasoconstrictor agents (such as cocaine or phenylephrine) have already been applied. Blowing the nose is essential before placement of any packing material to remove any clot that would prevent effective packing of a site of continuous bleeding. Cephalexin or amoxicillin-clavulanate is generally used prophylactically in patients with any nasal packing; TMP-SMX or azithromycin may be used in the penicillin-allergic patient. Admission is always indicated in patients with a posterior pack.

- 35 Answer E. Although prophylactic antibiotics have been shown to be effective in reducing the incidence of traveler's diarrhea, the U.S. Centers for

Disease Control (CDC) currently recommends their use only in immunocompromised patients or in patients with a concomitant serious illness. The chief concern of routine prophylaxis is the development of antibiotic resistance and patient neglect of common-sense precautions. Widespread resistance to fluoroquinolones has already occurred among many *Campylobacter* isolates. Bismuth subsalicylate has been shown to reduce the incidence of traveler's diarrhea. However, patients should be made aware of its high aspirin content and its tendency to cause patient stools to turn black.

- 36 Answer C. Typical radiographic findings in PCP include bilateral perihilar interstitial infiltrates that become progressively diffuse as the disease progresses. Other less common findings include the presence of solitary or multiple nodules, pneumatoceles, and the presence of a pneumothorax. Patients with HIV/AIDS who have been on prophylactic TMP-SMX therapy have a worse outcome in the setting of PCP requiring mechanical ventilation. A study reported in 2000 revealed that only 28% of mechanically ventilated patients with PCP who had been taking TMP-SMX before their diagnosis survived to hospital discharge. This compares with 47% of patients who had not been on prior prophylaxis. There is some suggestion that this effect may be due to emerging resistance among *P. carinii* isolates. Patients with AIDS and PCP usually present with a subacute history of dyspnea, nonproductive cough, low-grade fevers, and occasionally weight loss. They are frequently found to have tachycardia and tachypnea on physical examination. Patients without AIDS who are diagnosed with PCP usually present with an abrupt onset of dyspnea and respiratory insufficiency. A similar course in patients with AIDS may suggest the presence of a pneumothorax. Corticosteroids are beneficial in addition to antibiotic therapy in reducing mortality and clinical deterioration in patients with HIV and PCP who have hypoxemia (defined as a $P_{aO_2} < 70$ mm Hg or an alveolar-arterial gradient > 35). They are not used indiscriminately for all patients with PCP. Although recent studies suggest airborne transmission as the mechanism of infection in PCP, respiratory isolation is not currently recommended.

- 37 Answer D. Diverticulitis occurs in 10% to 30% of patients with diverticulosis. Severe bleeding occurs in only 3% to 5% of patients with diverticula. Most bleeding is minor and resolves spontaneously without intervention.

- 38 Answer A. Head trauma accounts for the large majority of all pediatric traumatic deaths. Falls

and motor vehicle crashes (MVCs) are the most common mechanisms. When compared to adults, children's heads are proportionally larger and heavier relative to the rest of their body resulting in a higher likelihood of serious injury. The possibility of intentional injury should be sought in all cases of pediatric head trauma. Unlike adults, in whom the extent of intracranial bleeding is limited by the fixed bony skull, infants may develop severe hemorrhagic shock from intracranial bleeding into a more flexible skull. Furthermore, intracranial catastrophes such as epidural hematomas may occur due to venous bleeding (rather than arterial bleeding as is more common in the adult) resulting in delayed presentations.

Answer D. Although A, B, C, and E all confer an increased risk of lenticular dislocation, trauma as a whole is the most common cause. Marfan's syndrome is the most common cause of inherited lenticular dislocation. Glaucoma and retinal detachment may complicate lens dislocation and must be managed in concert with an ophthalmologist. Iridectomy or lensectomy may be indicated in some cases.

Answer B. Chelation therapy for acute lead toxicity is indicated in patients with worsening clinical course or severe CNS or GI symptoms. Several chelation therapies exist for lead. Dimercaprol (or British antilewisite [BAL]) should be the first chelator given in patients with severe poisoning. It should be given before calcium disodium EDTA, as the latter, if given first, will cause chelated lead to cross the blood-brain barrier. Acute lead encephalopathy should be treated aggressively with chelation and management of attendant cerebral edema (hyperventilation and mannitol). Activated charcoal does not bind lead or other heavy metals. Patients deemed stable enough for outpatient chelation therapy should be given oral succimer. Penicillamine is a less effective alternative to succimer and should be given only if succimer is not tolerated due to GI side effects.

Answer A. The thoracic outlet syndrome comprises a group of pathologic conditions associated with compression of the structures at the junction of the upper extremity and trunk. The findings are neurologic (95%), venous (4%), and arterial (1%). The elevated arm stress test is the best physical examination tool to determine the presence of thoracic outlet syndrome. The test is accurately described by choice A, and a positive result is indicated by arm fatigue and pain, and the inability to keep it abducted. Choice B is the supraspinatus test to evaluate for rotator cuff tear. Choices C and D are Phalen and

Tinel signs, respectively, to evaluate for carpal tunnel syndrome and median nerve compression.

Answer E. The patient has evidence of uncomplicated urinary tract infection (UTI). The most common cause is *E. coli*, followed by other gram-negative bacilli, then streptococci. Treatment in cases of uncomplicated UTI is for 3 days with either TMP-SMX, fluoroquinolone, or a penicillin. The patient has allergies to both sulfa drugs and fluoroquinolones. Many bacteria which cause UTIs are resistant to amoxicillin alone, so amoxicillin-clavulanic acid is an alternative. Doxycycline and azithromycin have better coverage against gram-positive organisms and atypicals and often lack effectiveness against gram-negative bacilli.

Answer C. A small degree of chronic hemolysis occurs in all patients, which in most cases is clinically insignificant if appropriate iron supplementation is instituted. Mechanical, not porcine, valves require anticoagulation with Coumadin, and the International normalized ratio (INR) is generally kept between 2.5 and 3.5. Mechanical valves always have a metallic closure sound—absence of this sound indicates valve dysfunction. The risk of endocarditis depends on the length of time the valve is functioning, but occurs in less than half the number of patients.

Answer B. Pericardial effusions are seen as cardiomegaly on chest x-ray when approximately 250 mL of fluid has accumulated around the heart. Beck's triad of hypotension, muffled heart sounds, and jugular venous distention (JVD) occurs in <25% of patients with tamponade and should not be relied upon to make the diagnosis. Echocardiography, not MRI, is the diagnostic test of choice in most cases—CT scan may add helpful information, but is not required. Blind pericardiocentesis should only be performed in unstable cases of tamponade when echocardiography is not available as the complication rate is high. Tachycardia is the most common abnormal finding seen on EKG, and decreased voltages may also be seen more commonly than electrical alternans.

Answer C. In children, Ludwig's angina may occur without an antecedent cause, although the disease is less common in children than in adults. Asphyxiation is the most common cause of death, and it results due to upper airway obstruction due to the extensive swelling and edema of the floor of the mouth and neck. In patients with impending airway compromise, fiberoptic nasotracheal intubation is the preferred method of airway control. Owing to the

significant edema, trismus, secretions, and anatomic distortion of the airway, endotracheal intubation may be extremely difficult. Furthermore, although a surgical tray should always be present while fiberoptic intubation is undertaken, cricothyroidotomy is also more difficult to perform in the setting of Ludwig's angina. With early antibiotic therapy, the mortality rate of Ludwig's angina is <10%. Patients who have an underlying oral malignancy are not treated any differently than other patients with Ludwig's angina. All such patients are treated with immediate intravenous antibiotics, with rigorous observation of the airway.

Answer E. Not surprisingly, one of the best predictors for treatment failure and death is a history of prior intubation and ICU admission. In addition, extensive use of albuterol MDI canisters ≥ 2 per month, asthma hospitalizations ≥ 2 per year, ED visits for asthma ≥ 3 per year, hospitalization or ED visit for asthma in the last month, current use or recent discontinuation of systemic corticosteroids, comorbid cardiac disease, concomitant illicit drug use as well as serious psychosocial or psychiatric problems all predict death from an asthma exacerbation.

Answer B. Folate is a cofactor for the conversion of methanol's toxic metabolite, formic acid, to carbon dioxide and water. Once formic acid is produced, significant toxicity is probably inevitable, but the addition of folate to the standard treatment of methanol overdose (bicarbonate, alcohol dehydrogenase inhibitors, and dialysis) may attenuate further injury.

Answer C. *Clostridium difficile* is a gram-positive rod that is present in approximately 3% of healthy adults. However, antibiotic therapy used to treat unrelated infections increases the carriage rate of *C. difficile* tremendously. It has been implicated in 10% to 25% of patients with antibiotic-associated diarrhea, but in 50% to 75% of patients with antibiotic-associated colitis and nearly all patients with evidence of pseudomembranous colitis. Clindamycin is classically associated with the development of *C. difficile* colitis. However, the use of other antibiotics such as cephalosporins and fluoroquinolones may also result in colitis. The gold standard for diagnosis is considered to be a cell cytotoxicity assay but due to the cost and labor involved, most laboratories use a toxin detection assay. Positive stool cultures are not diagnostic because the bacteria are often present in healthy subjects and are increasingly present in patients who have been on antibiotics. Diphenoxylate (Lomotil) or other antimotility agents may worsen the disease by allowing further overgrowth

and increased time for toxin action. Colonoscopy is not required for treatment but may help to rule out other causes or confirm the diagnosis. In mild cases, withdrawal of the offending antibiotic may be all that is necessary. If symptoms do not rapidly resolve, metronidazole is the treatment of choice with vancomycin reserved for refractory cases. Children with *C. difficile* colitis typically have a more severe course, especially in children undergoing chemotherapy.

Answer B. Patients with hemolytic disorders, such as sickle cell anemia or hereditary spherocytosis, represent the largest group of pediatric patients with symptomatic cholelithiasis. Hemolysis puts these patients at risk for the formation of pigmented gallstones. Cystic fibrosis (CF) and obesity also put children at risk for cholelithiasis. In CF, patients experience inspissated biliary secretions leading to stone formation. Diabetes and cerebral palsy are unrelated diseases. Neonates often have multiple factors predisposing to gallstones but these patients are usually diagnosed in the neonatal ICU, before discharge and presentation in an ED. Examples of neonatal risk factors include prematurity, parenteral nutrition, surgery, blood transfusion, sepsis, and diuretic administration.

Answer C. Diagnosis of CAPD-associated peritonitis is through analysis of the peritoneal fluid—100 or more WBC per mm³ with a predominance of neutrophils or a positive Gram stain makes the diagnosis. Unlike cases of spontaneous bacterial peritonitis, where gram-negative enteric organisms predominate, patients with peritoneal dialysis catheters tend to develop peritonitis from gram-positive organisms, most commonly *Staphylococcus* species. Clinical signs and symptoms of infection can be extremely mild and asymptomatic infection is common. Most cases can be treated on an outpatient basis with intraperitoneally administered antibiotics. The antibiotics of choice are vancomycin plus any antibiotic with good gram-negative coverage, such as a fluoroquinolone, third-generation cephalosporin, aminoglycoside, or aztreonam.

Answer A. The metabolism of ethylene glycol is: Ethylene glycol \rightarrow Glycoaldehyde \rightarrow Glycolic acid \rightarrow Oxalic acid. Oxalic acid forms calcium oxalate crystals which can deposit in the renal tubules and cause renal insufficiency, and the other metabolites of ethylene glycol are directly nephrotoxic as well. Approximately one fourth of ethylene glycol is directly excreted in the kidneys, but hepatic metabolism with alcohol dehydrogenase catalyzes the formation of the toxic metabolites. The goals of therapy in patients with ethylene glycol toxicity are to block

the availability of alcohol dehydrogenase with either fomepizole or ethanol, and to hemodialyze the unmetabolized ethylene glycol. Methanol toxicity results in the formation of formic acid, which accumulates in the brain and causes blindness and death. Isopropanol causes generalized CNS depression similar to ethanol intoxication. Salicylate overdose results in direct nephrotoxicity, metabolic acidosis, electrolyte abnormalities and pulmonary and cerebral edema. Acetaminophen overdose causes fulminant hepatic failure.

54 Answer D. Neurologic dysfunction is the hallmark of heatstroke. Patients with heat *exhaustion* present with intact mental status, although they may present with generalized malaise, fatigue, headache, impaired judgment, vertigo, as well as nausea and vomiting. Patients with heat exhaustion also typically present with persistent and profuse sweating, with a core temperature that may be only mildly elevated and which is always $<104^{\circ}\text{F}$. Patients with heat stroke usually have a core temperature $>105^{\circ}\text{F}$ resulting in multiorgan failure. Patients may be anhidrotic and have elevated hepatic transaminases, although these findings are not required for the diagnosis. In addition, patients with heat exhaustion may also develop elevated hepatic transaminases, although the increase is less severe. Most significantly, patients with heat stroke have an altered sensorium (delirium) and may develop coma or seizures.

55 Answer C. This patient has an injury to zone II of the neck defined as the region of the neck superior to the cricoid cartilage and inferior to the angle of the mandible. Trauma to zone II is most common but also most amenable to repair due to relatively uncomplicated surgical exposure and vascular control. Traditionally, all patients with violation of the platysma have been taken to orthopaedic research (OR) for exploration. In the modern era of rapidly improving radiologic testing, operative repair may increasingly be deferred in favor of diagnostic testing such as helical CT angiography (e.g., to evaluate vascular injury indicated by a bruit or thrill), laryngoscopy, or esophagoscopy (e.g., to evaluate subcutaneous emphysema).

56 Answer A. The chest x-ray shows an enlarged, boot-shaped heart, consistent with tetralogy of Fallot. Patients with suspected tetralogy of Fallot should be managed in a step-wise manner—oxygen, fluid resuscitation, morphine, and α -agonist therapy. Prostaglandin E_1 may be indicated in neonatal patients to prevent closure of the ductus arteriosus and ensure enough shunting of blood to the pulmonary vasculature. The major adverse effects

of prostaglandin E_1 are apnea and hypotension. Albuterol is useful in cases of reactive airways disease but does not benefit with congenital heart disease. Indomethacin promotes closure of the ductus and would be detrimental. Aspirin is never indicated in pediatric patients except in the setting of Kawasaki disease. Ribavirin is indicated in select patients with respiratory syncytial virus (RSV) bronchiolitis. (Figure courtesy of Mark Silverberg, MD. From Silverberg M. *Hurst's the heart*, 11th ed. McGraw-Hill; 2004:602.)

57 Answer E. The patient has a large, spontaneous subconjunctival hemorrhage. There is no apparent chemosis or hyphema. Management is purely supportive with avoidance of NSAIDs. Patients with history of frequent subconjunctival hemorrhage may require a coagulopathy workup, but most patients with coagulopathies will have other manifestations of bleeding as well. Emergent ophthalmologic consultation is not indicated in patients with subconjunctival hemorrhage, but bloody chemosis or hyphema would necessitate this. Topical antihistamines or antibiotics are not indicated in patients with subconjunctival hemorrhage. (Figure courtesy of Anthony Morocco, MD. Reprinted with permission from Morocco A. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:85.)

58 Answer C. Eyelids do not contain subcutaneous fat—the presence of fat indicates likely globe injury. Patients with globe injuries should be seen emergently by the ophthalmologist. ED management involves broad-spectrum antibiotics, eye shielding, avoidance of recumbent position or Valsalva maneuvers, tetanus immunization, and treatment of nausea and vomiting. Choices A, B, D, and E are potential indications for ophthalmologic or plastic surgical repair to prevent significant cosmetic defects.

59 Answer E. This patient has herpes zoster (shingles). Although shingles may be more likely to occur in patients with leukemia, Hodgkin's lymphoma as well as other malignancies, most cases occur in otherwise healthy patients. (Figure reprinted with permission from Weber J. *Health assessment in nursing*, 2nd ed. Lippincott Williams & Wilkins; 2002.)

60 Answer C. The abdominal radiograph demonstrates multiple, radiopaque packets consistent with body packing of recreational drugs. Because cocaine and other sympathomimetic agents are often packed, cardiac monitoring is indicated for these patients. Asymptomatic patients may not require any specific therapy, but symptomatic patients should be evaluated carefully for signs of systemic toxicity and

treated with supportive care and antidotes as indicated. Patients may be given polyethylene glycol to induce whole bowel irrigation to promote more rapid transit of the packets through the GI tract. MRI is not indicated in patients with body packets, as it will not change management and adds little to the diagnosis. Surgical removal is indicated for signs of severe toxicity or bowel obstruction. Nasogastric (NG) aspiration is unlikely to provide any benefit and may instead cause retching and vomiting. Endotracheal intubation is not indicated in the absence of severe systemic toxicity. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:805.)

51 Answer D. The patient meets clinical criteria for thrombotic thrombocytopenic purpura (TTP). The classic clinical pentad includes fever, microangiopathic anemia, thrombocytopenia, renal dysfunction, and neurologic symptoms. Pathophysiology involves formation of microthrombi in the systemic vasculature, consuming platelets and causing microinfarctions, usually manifested in the kidneys and brain. Diagnosis is suspected by thrombocytopenia with anemia in a patient with suggestive clinical findings. Confirmation is made by the presence of schistocytes on peripheral blood smear. Notably, hematologic laboratory studies such as PT, PTT, and DIC panel are almost always normal. Treatment is urgent plasmapheresis with or without corticosteroids. Platelet transfusions are contraindicated, as they exacerbate microthrombi formation. Hemodialysis is not usually required as renal dysfunction is rarely severe. Splenectomy is used as a second-line therapy if plasmapheresis is not successful. Acyclovir may be used for patients with herpes simplex virus (HSV) encephalitis—although the patient has fever and headache, she lacks altered mental status or meningeal findings as would be seen in encephal meningitis, and the laboratory findings are more suggestive of TTP.

52 Answer A. Interestingly, patients with amaurosis fugax are considered low risk because treatment with antiplatelet agents (e.g., aspirin) is twice as effective in preventing strokes versus patients with hemispheric ischemia. High-risk patients include any patient with new-onset atrial fibrillation or flutter (potential cardioembolic source), patients with crescendo transient ischemic attack (TIA) (more than three discrete ischemic episodes within a 72-hour period), patients who develop a TIA while already on aspirin therapy (considered aspirin failure) and any patient meeting several of the "Johnston" criteria. Johnston et al. studied an ED

patient population who had ischemic symptoms for an average of 3.5 hours, which is longer than the typical TIA and longer than the newly revised definition of a TIA. However, he found five risk factors (age older than 60 years, diabetes mellitus, duration >10 minutes, weakness with episode, speech impairment with episode) that correlated to the risk of stroke within 90 days of ED discharge. The risk ranged from 0% without any of the risk factors to 34% with all five risk factors. These criteria have yet to be prospectively validated.

53 Answer C. The development of uterine contractions is the most common consequence of maternal trauma. This is due to stimulatory prostaglandins that are released upon contusion to the maternal uterus. Ninety percent of contractions stop spontaneously and tocolytics are generally not used. However, all pregnant patients with a viable fetus should undergo continuous cardiotocographic monitoring. In patients with abdominal pain and overt contractions, most authors recommend admission for 24 hours of monitoring. Though placental abruption is the most common cause of fetal loss related to trauma, the presence of uterine contractions is not enough to make this diagnosis. Fetal distress and persistent uterine irritability upon cardiotocographic monitoring is the most sensitive indicator of placental abruption. Uterine rupture is rare and most commonly occurs in women who have a history of prior cesarean delivery. It may be difficult to diagnose and is associated with a very high fetal mortality. Digital examination should never be performed after the first trimester because ED physicians could trigger catastrophic bleeding in patients with undiagnosed placenta previa. Such examinations are best left for the obstetrician after US has verified placental position and fetal viability.

54 Answer E. The strips demonstrate "late decelerations" of the fetal heart rate relative to uterine contractile activity. Late decelerations typically begin roughly 30 seconds after the onset of a uterine contraction and their nadir occurs after the peak of the contraction. This most often represents uteroplacental insufficiency, which is an interruption in uteroplacental blood flow. Early decelerations have the same gradual slope and shape as late decelerations but they occur with different timing relative to uterine contractions. The nadir of early decelerations and the peak of uterine contractions occur simultaneously and the fetal heart rate returns to baseline by the end of the contraction. Early decelerations are thought to result from compression of the fetal head, which causes a vagal reflex. Variable decelerations are the most common type of pattern seen during fetal cardiac monitoring. These decelerations have an

inconsistent appearance with respect to shape, width, depth, and timing relative to uterine contractions. They represent umbilical cord compression and are typically benign. However, frequent or particularly deep decelerations (i.e., representing fetal bradycardia) may be an indicator of fetal distress. (Figure reprinted with permission from Pillitteri A. *Maternal and child health nursing*. Lippincott Williams & Wilkins; 2006.)

65 Answer D. Concussion is defined as a clinical syndrome following mild traumatic brain injury with or without loss of consciousness. The symptoms are most commonly confusion, amnesia surrounding the traumatic event, headaches, and nausea. Other neurologic signs such as slurred speech, attention deficits, incoordination, mild personality changes, and disorientation may occur in conjunction with the amnesia and confusion. Neuroimaging is usually normal acutely, as concussion is characterized by functional, rather than structural, findings. MRI may detect subtle signs of cerebral contusion or axonal injury a few days after the injury in a minority of cases. Generally accepted guidelines indicate that athletes who have had a concussion should not return to sports until approximately 1 week after symptoms have resolved. This is in part due to fears about the brain being particularly vulnerable to a second impact in the week immediately following a concussion. Anosmia, the absence of the sense of smell, may occur in concussions and may be permanent, also causing alterations in taste.

66 Answer A. *Campylobacter* spp. is found in the stools of 5% to 14% of patients presenting with a chief complaint of diarrhea. The exact incidence in the United States is not known due to underreporting and sporadic testing.

67 Answer C. The patient has evidence of acute epididymitis, an infection of the epididymis causing local tenderness and lacking findings suggestive of testicular torsion (unilateral testicular tenderness or edema or absent cremasteric reflex). The etiologies in sexually active men younger than 35 years of age are *Chlamydia* or gonococcus. In men older than 35 years, *E. coli* is the most common cause. Antibiotic therapy is directed to the causative organism.

68 Answer D. Rotavirus is the most common viral and overall cause of acute gastroenteritis among pediatric patients. The peak seasons for rotavirus infection are spring and winter with significant hospital outbreaks. Fever, vomiting, and diarrhea are the most common clinical findings. Diagnosis may be confirmed with a stool assay, but this is useful mostly

for isolation precautions during hospitalization. Most normal hosts recover in <1 week but immune-compromised patients are at risk of significant dehydration.

69 Answer E. The most common causes of hypophosphatemia in the ED are probably respiratory alkalosis, treatment of diabetic ketoacidosis (DKA), and alcoholism. The most common mechanism is an intracellular shift of phosphate (respiratory alkalosis, treatment of DKA). Renal insufficiency leads to phosphate retention, whereas hyperparathyroidism causes increased renal excretion.

70 Answer D. The heterophile antibody test, or monospot, is a rapid assay for the diagnosis of infectious mononucleosis due to EBV. It has lower sensitivity early in the illness (<70% in the first week), but steadily improves in the next few weeks. Specificity is excellent and reported to be near 100%. It is important to tell patients suspected of having infectious mononucleosis with a negative monospot test that either the illness is early in its course or a non-EBV cause is possible. Infectious mononucleosis is a subacute to chronic multisystem syndrome of pharyngitis, lymphadenopathy, splenomegaly, hepatitis, and fatigue. Splenomegaly is perhaps the most important clinical feature for the emergency physician (EP) as demonstration of this finding requires strict avoidance of contact sports and aggressive physical activity to prevent splenic rupture. Treatment is supportive. Almost one third of all patients with infectious mononucleosis carry group A streptococcus, which confounds the diagnosis of a patient with febrile pharyngitis and leads to inappropriate antibiotic use.

71 Answer A. The patient has endocarditis of a prosthetic valve, which is most commonly due to coagulase-negative staphylococci. *S. viridans* is the most common cause of native valve endocarditis. Choices C, D, and E are uncommon causes of native valve endocarditis.

72 Answer B. All of the items listed may result in pancreatitis. In adults, gallstones are the most common cause in most populations (45% of cases) whereas alcohol abuse causes the bulk of the remainder (35% of cases). In children, however, trauma is the most common cause. The most common infectious cause is the mumps virus. Overall, trauma, infection, and idiopathic causes account for 70% of pediatric pancreatitis cases.

73 Answer C. Sixty percent to 85% of patients have motor weakness at the time of presentation. The most

common pattern of muscle weakness is symmetric lower-extremity weakness although any pattern can be seen. Bladder and bowel findings occur late in the course of the disease. Although it also occurs late in the course of compression, any patient with saddle anesthesia should be considered to have cauda equina syndrome until proved otherwise. Back pain is the most common symptom of epidural spinal cord compression, occurring in 83% to 95% of patients, and characteristically precedes neurologic symptoms by approximately 2 months.

74 Answer C. Tick paralysis is likely due to an unidentified toxin, which is transmitted to the human host within a week of tick attachment. The typical clinical presentation is that of ascending flaccid paralysis with loss of deep tendon reflexes, similar to Guillain-Barré syndrome. Respiratory failure can occur due to diaphragmatic weakness. Ataxia is a less common presentation and may occur in conjunction with the flaccid paralysis. Cranial nerve and sensory findings are rare. Treatment is careful removal of the tick, which results in complete resolution of symptoms within 2 days.

75 Answer A. The spleen is the most common organ injured in blunt abdominal trauma. In order of decreasing frequency, it is followed by the liver, kidney, small bowel, bladder, colon, diaphragm, pancreas, and retroperitoneal duodenum.

76 Answer A. This patient has bacterial vaginosis (BV), which is the most common lower genital tract infection among women of reproductive age. Clue cells, which are squamous vaginal epithelial cells coated with bacteria, are evident on the wet mount. Classically, the disease has been diagnosed when three of the four Amsel criteria are present:

- An adherent and homogenous vaginal discharge
- Vaginal pH >4.5
- Detection of clue cells on saline wet mount
- An amine odor after the addition of potassium hydroxide (whiff test)

Though these criteria remain widely used, they have been criticized for their subjectivity. New assays are in development. Though *Gardnerella vaginalis* is present in approximately 95% of cases, BV is a polymicrobial infection with poorly understood origins. Furthermore, although it was originally considered a relatively benign illness, recent research has shown a clear correlation with preterm labor and delivery, preterm premature rupture of membranes, spontaneous abortion, chorioamnionitis, and postpartum infections such as endometritis. Therefore, all pregnant and nonpregnant women with BV should

be treated. As in nonpregnant women, metronidazole is the treatment of choice (250 mg orally three times daily for 7 days) although clindamycin is an acceptable alternative (300 mg orally twice daily for 7 days). There is no evidence that metronidazole is unsafe in pregnancy. (Figure from Mandell GL, ed. Essential atlas of infectious diseases, 2nd ed. Philadelphia: Current Medicine Inc; 2001, with permission.)

77 Answer C. The EKG shows a wide-complex, regular tachycardia, which is almost always ventricular tachycardia (VT). Amiodarone, procainamide, or lidocaine may be used to treat stable VT. Although cardioversion may also be performed, it is painful for awake patients and may not be necessary for patients without hemodynamic instability. Adenosine and diltiazem are both used in patients with narrow-complex tachycardias and have no role in ventricular dysrhythmias. Supraventricular tachycardia (SVT) with aberrant conduction can also cause a regular, wide-complex tachycardia. VT is far more common, and may be distinguished from SVT with aberrancy by the presence of fusion beats, atrioventricular (AV) dissociation, wider QRS complexes (>0.14 second), and concordance of precordial leads. When in doubt, the EP should always treat regular wide-complex tachycardia as VT.

78 Answer B. Sudden infant death syndrome (SIDS) is defined as the sudden, inexplicable death of any infant whose cause cannot even be diagnosed by autopsy. The peak age for SIDS is 2 to 4 months. Risk factors include maternal smoking, young maternal age, preterm age, among others. Apnea and hypoventilation are the most likely explanations, but dysrhythmias, airway obstruction, and trauma are all proposed as possible contributors. Infants should be placed on their backs to sleep to help reduce the incidence of SIDS.

79 Answer E. Owing to the large distribution of vestibular pathways in the brain, there are many possible centrally located lesions that result in vertigo. The most important of these for emergency room physicians is vertebrobasilar insufficiency (transient ischemic attacks [TIAs] of the vertebrobasilar arterial circulation) or frank cerebellar stroke. Vertebrobasilar arterial ischemia is especially common in elderly patients with typical risk factors for vascular disease (e.g., diabetes, hypertension, hyperlipidemia, and smoking). It is important to recognize these patients because they require admission and possible monitoring in an ICU setting (depending on their syndrome). Cerebellar infarctions are known for an unpredictable clinical course and sudden

deterioration of previously alert, stable patients. Neurosurgical intervention is typically required when the cerebellar infarct results in impingement on the fourth ventricle with subsequent hydrocephalus. The optimal time of intervention, however, has yet to be determined.

80 Answer E. Tube thoracostomy is the most common procedure performed in the setting of thoracic trauma. It is also the primary means by which a primary or secondary spontaneous pneumothorax is treated (a small pneumothorax may be observed without intervention). The presence of a pneumothorax must have been caused by a defect in the patient's bronchial tree resulting in communication between the bronchioles and the pleural space. The chest tube is placed within the pleural space such that when suction is applied to the chest tube the accumulated pleural air will be removed allowing the lung to expand. However, because the original lesion does not heal instantaneously, the application of suction to the pleural space may also remove air directly from the bronchial system through the original defect that caused the pneumothorax. The expectation is that the rate of air accumulation in the pleural space through the defect is slower than the rate of air removal, thereby allowing the lung to expand. The vacuum is maintained until there is no longer any evidence of a leak (therefore signifying that the defect has healed). The easiest way to test for the presence of a leak is to ask the patient to cough and then examine the water seal chamber for air bubbling up through the column of water. Coughing increases intrathoracic pressure which forces air through the defect, if one is still present. In the case of a very small defect, there may not be a detectable leak after correct tube placement. Leaks can also be due to inadequate insertion of the chest tube such that some of the suction holes lie outside the pleural cavity. Alternatively, there may simply be a leak in the vacuum tubing or connectors. In these cases, however, the lungs will frequently fail to expand as the suction capacity is "wasted" by continuously removing air from the limitless ambient environment instead of the pleural space. This will be evident by virtue of a constant bubbling in the water seal chamber. The amount of water in the water seal chamber has no effect on the amount of air escaping from the system.

81 Answer B. IBS is a common, chronic GI illness characterized by abdominal pain or discomfort, bloating, and either constipation or diarrhea. Although it is not a psychiatric diagnosis, patients with IBS more commonly have a concomitant psychiatric diagnosis (most commonly anxiety or depression). The cause of IBS is not known, but it is not related

to food allergies. It is at least twice as common in women as in men. Although there are several clinical criteria for the disease, one well known set of criteria (the Rome II criteria) includes abdominal pain that is relieved after defecation as necessary for a diagnosis of IBS.

82 Answer D. Although US is the gold standard for the diagnosis of cholelithiasis, only 50% of stones in the common bile duct (CBD) can be visualized by US. This is due, in part, to the proximity of the duodenum to the CBD and the interference that occurs due to luminal bowel gas. However, US may detect a dilated CBD in excess of 6 mm (the upper limit of normal) in up to 75% of cases. Therefore, US may suggest but not confirm the diagnosis. CT scanning is extremely useful in diagnosing complications of gallstones, such as perforation of the gallbladder, abscess formation, pericholecystic fluid, pancreatitis, and gas in the gallbladder wall. The sensitivity and specificity of CT has been improving with the use of helical scanners, however, and its sensitivity and specificity is now roughly 85%. Likewise, cholescintigraphy has inadequate sensitivity and specificity to be useful for the detection of CBD stones.

83 Answer A. Uterine rupture may occur as a result of substantial maternal trauma. However, among typical pregnant women, the primary risk factor for uterine rupture is a prior cesarean delivery (c-section), particularly with a "classic" vertical incision. Patients may present with significant abdominal pain and vaginal bleeding or they may be relatively asymptomatic if only minor dehiscence has occurred. A more recent meta-analysis suggests that only the risk of dehiscence is increased among women with a prior cesarean section (excluding women with a classic vertical incision). Oxytocin did not increase the risk of rupture. Emergent cesarian-section is indicated in all cases of uterine rupture.

84 Answer E. The patient has failed outpatient therapy for pyelonephritis. The possible reasons for this are noncompliance with antibiotics, resistant organism, concomitant kidney stone, or renal abscess. The patient has had 2 weeks of an appropriate antibiotic for pyelonephritis, which should be adequate for clinical cure unless a kidney stone or renal abscess is present—in this case, a CT scan is recommended to evaluate these possibilities. Starting a less broad-spectrum antibiotic such as TMP-SMX or metronidazole is not indicated, especially if no urine culture is performed beforehand. Extending the course of ciprofloxacin beyond 2 weeks is only indicated in cases of male prostatitis.

- 85 Answer B. Certain oral medications cause severe esophageal irritation when swallowed—doxycycline, tetracycline, aspirin, and potassium chloride. Of these, potassium chloride is the most caustic, sometimes leading to esophageal perforation and penetration into the mediastinal great vessels.
- 86 Answer B. Diarrhea is the most common cause of a normal anion gap metabolic acidosis. Fluid from the intestine distal to the stomach is bicarbonate rich, so diarrhea results in bicarbonate loss and subsequent metabolic acidosis. As bicarbonate is lost, chloride is avidly reabsorbed by the kidneys resulting in a hyperchloremic metabolic acidosis.
- 87 Answer C. NEC is the most common GI emergency affecting neonates. However, because premature infants are predominantly affected, it is a disease that is most commonly diagnosed in the neonatal intensive care unit (NICU) and only rarely seen in the ED. Interestingly, however, the age at onset of NEC is inversely related to the gestational age and birth weight. Therefore, low birth weight infants who initially look well in the NICU may be discharged home before the development of NEC. Initial findings in NEC are nonspecific and include ileus (multiple dilated loops of small bowel) or an asymmetric bowel gas pattern. With progression of the disease, however, air spreads through ulcerated GI mucosal epithelium resulting in pneumatosis intestinalis or air within the biliary tract (portal venous). Pneumatosis intestinalis occurs in 75% of infants with NEC and is the most specific finding.
- 88 Answer B. The patient has clear clinical evidence of meningitis. Given the time course, it is unclear whether the etiology is viral or bacterial, so a cautious approach should be taken. Ideally, the patient should have a lumbar puncture as soon as possible, but antibiotics should not be delayed in such cases as they do not appear to significantly affect culture results in the first 4 hours of therapy. Corticosteroids are now part of the standard of care for treatment of suspected bacterial meningitis as they improve functional outcomes. The indications for CT scan before lumbar puncture are altered mental status, focal neurologic deficit, suspected brain mass lesion, and signs of increased intracranial pressure. MRI of the brain has little role in the emergent evaluation of meningitis.
- 89 Answer B. *E. coli* O157:H7 (also known as enterohemorrhagic *E. coli* or enterohemorrhagic *Escherichia coli* [EHEC]) is the most important strain of *E. coli* that commonly causes diarrhea in the United States. It is most frequently associated with eating undercooked ground beef. However, outbreaks from contamination of apple cider, raw milk, and most recently, spinach, have also been reported. Antibiotics are contraindicated in all cases because they may induce the expression and release of toxins (Shiga toxins), which may worsen the disease and increase the risk of developing hemolytic-uremic syndrome (HUS). HUS is a syndrome characterized by microangiopathic hemolytic anemia, thrombocytopenia, and renal failure and occurs in as many as 25% of cases (most of which occur in children). HUS is the most common cause of renal failure in children. Thrombotic thrombocytopenic purpura (TTP) is a less frequent complication of EHEC infection, and more commonly occurs in the elderly or immunocompromised. Infection with EHEC results in a hemorrhagic colitis after an incubation period, which ranges from 3 to 8 days. Fever is atypical and a different pathogen should be considered if fever is present.
- 90 Answer D. This patient experienced acute food poisoning due to *Staphylococcus*. The illness is not caused by infection of the bacteria but by a heat-stable enterotoxin produced by the bacteria before ingestion. *Staphylococcus* proliferates with ease in foods with a high protein content, such as ham, eggs, poultry, custard-based pastries as well as potato or egg salads. The illness occurs 1 to 6 hours after ingestion and is typically acute in onset. Abdominal pain and vomiting are the most prominent symptoms although occasionally a mild diarrhea may also be present. Symptoms are self-limited, typically resolving within 8 hours and only rarely lasting for a full day. Because the disease is caused by a heat-stable toxin, cooking will not remove the toxin once it is formed, and antibiotics have no role in treatment. Although *Bacillus cereus* causes a similar illness by virtue of a heat-stable toxin it produces, it almost always occurs after ingestion of fried rice. Of note, *B. cereus* may produce a second, different syndrome characterized primarily by diarrhea and abdominal pain. This latter syndrome results from the production of a heat-labile toxin that is released *in vivo* after ingestion of live organisms. It is clinically similar to food poisoning caused by *Clostridium perfringens*, and results from ingestion of meats or vegetables colonized with the bacterium.
- 91 Answer D. If they occur, 90% of recurrent peritonsillar abscess (PTAs) develop within 1 year of the initial infection with the majority occurring very shortly after the initial infection. Therefore, many authors consider such recurrences an inadequately treated initial infection, or simply a continuation of the same infection. Recurrence is more common in

adults than in children although the reasons for this are not known. Although tonsillectomy, whether it is performed emergently or after the initial infection has resolved, drastically reduces the rate of recurrence, PTAs have been known to occur after the tonsils have been removed. The treatment of PTAs is surgical with adjunctive antibiotic therapy. Surgical modalities include aspiration, incision and drainage, or tonsillectomy. Antibiotic therapy in the absence of surgical drainage is not effective. However, penicillin is the antibiotic of choice in these patients, whereas erythromycin or other macrolides are used for patients with penicillin allergies. Adding metronidazole to the initial regimen may increase the success rate although limited data is available regarding alternative antibiotic strategies.

- 92** Answer B. There are no universally accepted criteria for liver transplantation in patients with acetaminophen overdose. However, the King's College criteria are the most widely used and accepted. The King's College criteria recommends transplantation for:

(1) All patients with a pH <7.30 after adequate fluid resuscitation; or (2) Patients in whom all of the following occurs within a 24 hour period: (a) Creatinine >3.4 g/dL, (b) PT >100 s (INR >6.5), (c) Development of grade III or IV hepatic encephalopathy.

Without transplantation, only 15% of patients who meet these criteria will survive. Since several patients who meet the criteria die before a transplanted organ becomes available or are too ill for transplant, there is a need for earlier identification of high risk patients. To this end, a recent study suggested that the King's College criteria be modified to include an arterial blood lactate level >3.5 mmol/L within 4 hours of admission or a level of >3.0 mmol/L after adequate fluid resuscitation (12 hours after admission). The authors suggested that the addition of the lactate criteria increases the detection of high risk patients and improves the chances for early transplantation.

- 93** Answer D. The absence of fetal heart tones in an intrauterine gestation with a crown-rump length >5 mm (correlates roughly to 6.2—weeks' gestation) is convincing evidence of fetal demise. Missed abortion refers to the continued presence of a nonviable fetus aged <20—weeks' gestation for at least 8 weeks without the passage of maternal or fetal tissue. The persistent presence of a dead fetus may result in coagulation abnormalities and disseminated intravascular coagulation. However, this is primarily a historical diagnosis due to the prevalence of US. Therefore, most women present to a physician with vague complaints of crampy abdominal pain or

vaginal bleeding or they are noted to have a uterus that is too small for their dates. Subsequent US identifies intrauterine fetal demise before coagulation complications occur and the patient is referred to an obstetrician for definitive management.

- 94** Answer B. In a well newborn without fever, hyponatremia is the most common cause of seizures. Water intoxication is the most common cause of hyponatremia during infancy. Infants are unable to adequately concentrate urine so parents who dilute formula or give their infants tap water put their infants at risk. Hypocalcemia is also a very common cause of seizures in the neonate, so serum calcium levels should be checked. In fact, all infants have a slight decline in serum calcium levels with a nadir at 24 to 48 hours. Symptomatic hypocalcemia is more common in infants of diabetic mothers, preterm infants, or infants with a history of anoxic encephalopathy. Hypomagnesemia is not as common as hypocalcemia, but symptoms of hypomagnesemia mimic those of hypocalcemia and it is difficult to correct hypocalcemia if the serum magnesium is also low. Therefore, infants with seizures should have a comprehensive evaluation of their electrolytes. Hypokalemia is uncommon in infancy and does not typically cause seizures. Maple syrup urine disease is a rare disease resulting from the inability to catabolize branched chain amino acids. Infants typically present between 4 to 7 days of life with poor feeding, vomiting, or lethargy. Neurologic manifestations rapidly develop, such as alternating hypotonia and hypertonia, dystonia, seizures, and encephalopathy.

- 95** Answer C. The patient has acute mastoiditis, resulting from partially treated otitis media. Up to 10% of mastoiditis cases have normal tympanic membranes on examination. Acute mastoiditis is most commonly due to *S. pneumoniae*; chronic mastoiditis is usually due to *Pseudomonas*. CT scan of the mastoid area may be useful in making the diagnosis, and management generally involves admission for IV antibiotics and surgical consultation for possible mastoidectomy.

- 96** Answer A. Patients with pill esophagitis present with a history of odynophagia and severe, constant retrosternal pain. The pain of esophagitis may be confused with pain due to myocardial infarction. However, detailed history taking should reveal that the pain worsens with swallowing. In addition, patients may reveal that they took their medicines without liquids or did not remain upright for a sufficient amount of time after taking their pills. All of the medicines listed have been reported to cause pill esophagitis. However, alendronate is the most

common cause. Doxycycline is the most common antibiotic resulting in pill esophagitis.

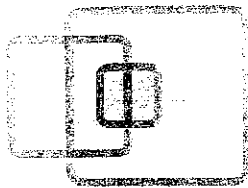
97 Answer D. Patients with a combination of hypotension and pelvic fracture have extremely high mortality and should be managed aggressively. Initial stabilization involves securing the pelvis with a bedsheet or tightening device to reduce the volume into which hemorrhage can occur and copious crystalloid and blood resuscitation. If the patient stabilizes, further evaluation with CT scan may be performed to better delineate the injuries. However, if the patient remains unstable, angiography with embolization should be performed to limit the extent of hemorrhage. As a general rule, hemodynamically unstable trauma patients should *never* have CT scans performed.

98 Answer B. Although handlebar injuries are simply a form of blunt abdominal trauma, which therefore put patients at risk for liver and spleen injuries, there is an increased risk of pancreatic and small bowel injuries. Classically, pancreatic or duodenal injuries are associated with pediatric handlebar injuries. Patients with pancreatic injury often develop delayed symptoms and may have a relatively benign presentation initially. Eventually, they develop abdominal pain, nausea, and vomiting and have evidence of pancreatic injury by elevated enzymes on laboratory analysis. Acute closed loop small bowel obstruction and rupture may also occur with handlebar injuries. Owing to the lack of significant blood loss, patients may again be relatively asymptomatic. Because the small bowel contains relatively little air, up to 85% of cases will have a normal upright abdominal film (i.e., no free air) and 50% will have no signs of peritonitis on examination. Therefore, physicians must maintain a high suspicion for injury in cases of pediatric handlebar trauma.

99 Answer D. The pain of trigeminal neuralgia is characteristically explosive in onset, severe in intensity, brief, lasting 2 seconds to 2 minutes, and unilateral. It invariably involves either the V2 or V3 branch of the trigeminal nerve and sometimes involves both branches. It very rarely affects the V1 (ophthalmic) branch of the trigeminal nerve. Cranial

nerve testing reveals completely normal function of the trigeminal nerve and remaining cranial nerves. Patients typically have normal dentition. In addition, patients with trigeminal neuralgia typically have "trigger zones" especially in the perioral area and near the nostril. Tapping or palpating these areas may provoke an attack. Other stimuli such as wind on the face, chewing, brushing teeth, and shaving may also provoke attacks of pain.

100 Answer E. This patient is at risk for aspiration pneumonia by virtue of his decreased airway protection and tube feeds. Although there is no definitive way to diagnose aspiration pneumonia, this patient's history of witnessed vomiting with choking in the setting of a patient at risk for aspiration is virtually diagnostic for aspiration. Aspiration pneumonitis is caused by an inflammatory response in the lungs after the aspiration of low pH gastric contents. Aspiration pneumonitis develops within hours of aspiration, and its severity is directly related to the volume and pH of the aspirated material. Treatment is supportive, and antibiotics and steroids are not useful. However, episodes of aspiration pneumonitis may become secondarily infected, resulting in aspiration pneumonia. More commonly, aspiration pneumonia develops without significant preceding pneumonitis. Such infections are due to the aspiration of oropharyngeal flora and are most commonly polymicrobial. While anaerobes have classically been implicated in cases of aspiration, anaerobic antibiotic coverage may actually only be needed in patients with very poor oral hygiene, putrid sputum, or evidence of necrotizing pneumonia or lung abscess chest x-ray. Metronidazole is a specific therapy for anaerobic infections, but its use as monotherapy in aspiration pneumonia is associated with a high failure rate. The fluoroquinolones are broad spectrum agents and they achieve good tissue levels. However, they do not need to be combined with corticosteroids, for which there is no role in the setting of aspiration, despite their wide use. Aztreonam does not have any gram positive coverage so it should not be used as monotherapy. First-line antibiotic therapy in nursing home residents with aspiration pneumonia may include piperacillin-tazobactam, levofloxacin, or ceftazidime.



Test 5

Questions

- 1 A 44-year-old woman presents with right wrist pain. She fell on her hand the previous day and has pain in her radial wrist. The wrist is tender in the anatomic snuffbox. Plain radiographs of the wrist are completely normal. Which of the following is the most appropriate next step in management?
- (A) Orthopaedics consultation
 - (B) Discharge home with thumb range of motion exercises
 - (C) Discharge home with Velcro wrist splint
 - (D) Discharge home with thumb spica splint
 - (E) Admit for observation of wrist
- 2 A 35-year-old woman presents in a coma (Glasgow Coma Scale [GCS] 3) after a motor vehicle crash (MVC) and is intubated for airway protection. Further evaluation reveals no life-threatening chest, abdomen, or pelvic injuries. Vital signs are normal. A computed tomography (CT) scan is performed and is normal. Which of the following is the most likely diagnosis?
- (A) Epidural hematoma
 - (B) Subdural hematoma
 - (C) Diffuse axonal injury (DAI)
 - (D) Cerebral contusion
 - (E) Intraparenchymal hematoma
- 3 Upon starting your shift, you receive sign-out on a 46-year-old male diabetic patient who is being treated with an intravenous insulin drip for diabetic ketoacidosis (DKA). Two hours later, a repeat chemistry panel reveals the following: Na^+ 141 mEq per L, Cl^- 112 mEq per L, HCO_3^- 17 mEq per L, blood urea nitrogen (BUN) 16, creatinine 0.9, glucose 278 mg per dL. Which of the following is true?
- (A) The patient has a mixed high anion gap (AG) ketoacidosis and nonanion gap hyperchloremic metabolic acidosis (HCMA).
 - (B) He should be given subcutaneous insulin and his insulin infusion can be discontinued after 30 to 60 minutes.
 - (C) His diabetic ketoacidosis (DKA) is not yet resolved and he requires an ongoing intravenous insulin infusion.
 - (D) The patient should be given bicarbonate replacement therapy.
 - (E) A repeat arterial blood gas (ABG) should be performed to guide further therapy.
- 4 A 6-year-old girl presents with abdominal pain. She has had moderate, constant periumbilical pain for several hours with associated nausea. Her parents noted a rash on her legs and buttocks for several days, which they attributed to poison ivy. Physical examination demonstrates an afebrile, uncomfortable patient, diffuse abdominal tenderness without true rebound or guarding, a maculopapular rash on the legs and buttocks, and diffuse joint tenderness. Which of the following is the most appropriate next step in evaluation?
- (A) Urinalysis
 - (B) CT scan of the abdomen/pelvis
 - (C) Anti-streptolysin O antibodies (ASO) titer
 - (D) Blood cultures
 - (E) Meckel scan
- 5 Which of the following is true regarding acute mesenteric ischemia (AMI)?
- (A) Most patients have a lactic acidosis early in the course of their illness.
 - (B) The mortality rate of acute mesenteric ischemia (AMI) is roughly 70%.
 - (C) In the absence of angiography, intravenous heparin infusion is the standard of management.
 - (D) Tenderness on physical examination is most often worse than a patient's subjective complaint of pain.
 - (E) The most common CT finding is gas in the portal venous system.
- 6 A 32-year-old pregnant woman in her third trimester presents with dysuria. She has a penicillin allergy. Urinalysis demonstrates bacteria, but no white blood cells, leukocyte esterase, or nitrites. Physical examination is normal. Which of the following is the most appropriate next step in management?
- (A) Close outpatient observation
 - (B) Trimethoprim-sulfamethoxazole

- (C) Ciprofloxacin
(D) Nitrofurantoin
(E) Amoxicillin
- 7 Which of the following is the most common cause of acute respiratory distress syndrome (ARDS)?
(A) Sepsis
(B) Near drowning
(C) Multiple blood transfusions
(D) Multiple blunt trauma
(E) Pancreatitis
- 8 A 70-year-old woman presents with blurry vision in her right eye and a right-sided headache. The patient also complains of malaise, and is tender in her right temporal region. Which of the following is true regarding this patient's illness?
(A) Steroids are ineffective in preventing disease in the contralateral eye.
(B) Patients have a higher risk of arterial aneurysms.
(C) Steroid therapy should be withheld until definitive diagnosis is made.
(D) Men are more commonly affected.
(E) The disease is very rare in patients older than 50 years of age.
- 9 A 62-year-old woman presents with hypertension, diabetes mellitus, and emphysema with a 3-week history of dyspnea on exertion, three-pillow orthopnea, and bilateral lower extremity edema. She denies fevers, cough, or chest pain. A chest x-ray is shown in Figure 5-1A and B. The patient's electrocardiogram (EKG) does not show any ischemic changes. Her vitals are: Respiratory rate 22 per minute, pulse 108, BP 154/88, pulse oximetry 88% on room air. What is the next best step in management?
- (A) Perform an immediate therapeutic thoracentesis.
(B) Perform a diagnostic thoracentesis to rule out empyema.
(C) Administer oxygen, nitrates, and furosemide.
(D) Perform rapid sequence intubation.
(E) Order a B-type natriuretic (BNP) level in order to determine the best management.
- 10 The most common cause of an intracranial tumor is
(A) Meningioma.
(B) Astrocytoma.
(C) Medulloblastoma.
(D) Metastases.
(E) Pituitary adenoma.
- 11 Which of the following is true regarding heart transplant recipients?
(A) The resting heart rate is decreased from their pretransplant baseline.
(B) Tamponade cannot occur in a transplanted heart.
(C) Acute rejection is usually diagnosed by endomyocardial biopsy.
(D) There is no increased risk of endocarditis with invasive procedures.
(E) The heart rate increases only minimally with exercise or stress.
- 12 Which of the following is true regarding hip fractures?
(A) The highest incidence of avascular necrosis (AVN) occurs in patients with intertrochanteric fractures.
(B) Isolated fractures of the lesser trochanter are most commonly seen in young adults.

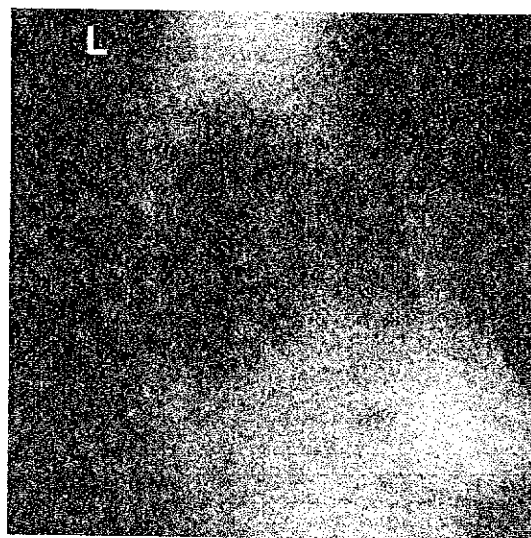
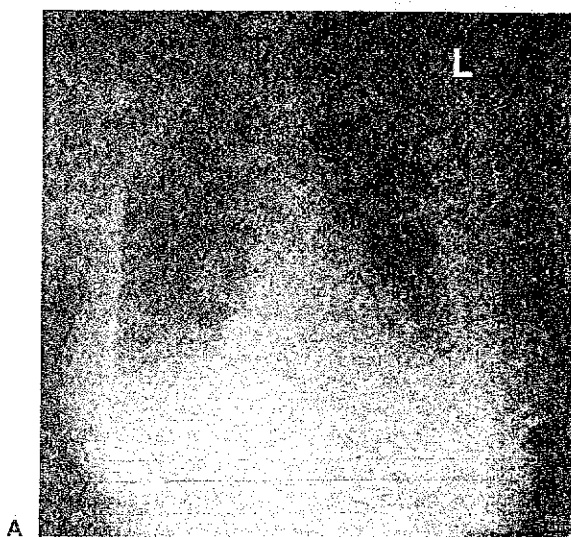


Figure 5-1.

- (C) Femoral nerve block is contraindicated in the setting of a hip fracture.
- (D) The development of acute respiratory distress in a patient with an acute femoral shaft fracture but no other trauma is most likely due to a pulmonary embolism (PE).
- (E) All of the above.
- 13** Which of the following is the most common cause of large bowel obstruction?
- (A) Malignancy
- (B) Sigmoid volvulus
- (C) Adhesions
- (D) Diverticular disease
- (E) Fecal impaction
- 14** Which of the following is the most common cause of dysuria?
- (A) Bacterial infection
- (B) Viral infection
- (C) Fungal infection
- (D) Parasitic infection
- (E) Allergic urethritis
- 15** Which of the following is the most sensitive physical examination test for an anterior cruciate ligament (ACL) tear?
- (A) Anterior drawer
- (B) Posterior drawer
- (C) Lachman
- (D) McMurray
- (E) Thompson
- 16** The most common cause of sexually transmitted disease in the United States is
- (A) *Trichomonas vaginalis*.
- (B) *Chlamydia trachomatis*.
- (C) *Treponema pallidum*.
- (D) *Neisseria gonorrhoeae*.
- (E) *Candida* spp.
- 17** Which of the following is the most common toxicity associated with cyclosporine?
- (A) Hyperuricemia and gout
- (B) Hyperlipidemia
- (C) Nephrotoxicity
- (D) Hepatotoxicity
- (E) Hypertension
- 18** A 1-week-old infant is brought to the emergency department (ED) with cyanosis. Room air pulse oximetry is 88% and the patient appears to have decreased activity. Chest x-ray reveals a slightly enlarged heart with increased pulmonary consolidation. Which of the following medications is indicated?
- (A) Albuterol
- (B) Indomethacin
- (C) Ribavirin
- (D) Cefotaxime
- (E) Propanolol
- 19** Which of the following is true about appendicitis in pregnancy?
- (A) Leukocytosis may be physiologic during pregnancy.
- (B) Appendicitis is more common in pregnant than in nonpregnant women.
- (C) Ultrasonography has a sensitivity of approximately 40% for appendicitis during pregnancy.
- (D) Appendiceal rupture is most common during the first trimester.
- (E) All of the above.
- 20** A 77-year-old man with type 2 diabetes presents with 4-day history of progressively worsening left ear pain, hearing loss, and discharge. On examination, he has a temperature of 101°F, he appears fatigued, and his tympanic canal is markedly edematous with foul drainage. His glucose level is 400. Which of the following is true regarding this condition?
- (A) IV ciprofloxacin and ENT consultation are indicated.
- (B) *Streptococcus pneumoniae* is the single most likely pathogen.
- (C) Cranial nerve involvement almost always begins with the abducens nerve.
- (D) Sinus x-ray may be warranted to evaluate extent of disease.
- (E) Antiviral therapy should empirically be started.
- 21** A 32-year-old G₃P₂ at 39 weeks' gestation presented to your community ED after spontaneous rupture of membranes and with regular uterine contractions roughly 3 minutes apart. Although the fetal head delivers without difficulty, the shoulders appear to be trapped and you suspect shoulder dystocia. The next best step in management should be
- (A) Midline episiotomy.
- (B) McRobert maneuver.
- (C) Suprapubic pressure.
- (D) Rubin maneuver.
- (E) Wood corkscrew maneuver.
- 22** A 2-year-old boy is brought in by his parents with a rash on his trunk. On examination, you discover a rose-colored maculopapular rash on his chest, neck, and arms. The patient is currently afebrile, but the parents tell you that the patient was seen by one

your colleagues yesterday for a febrile seizure. Which of the following is the most likely diagnosis?

- (A) Roseola infantum
- (B) Rubeola
- (C) Rubella
- (D) Erythema infectiosum
- (E) Scarlet fever

- 23 A 9-year-old boy presents with fever, sore throat, and refusal to eat or drink because of severe odynophagia. His oropharyngeal examination is shown in Figure 5-2. Which of the following is the most likely etiology?



Figure 5-2.

- (A) Aphthous stomatitis
- (B) *Streptococcus pyogenes*
- (C) *Corynebacterium diphtheriae*
- (D) Coxsackievirus
- (E) Herpes simplex virus

- 24 In a perilunate dislocation, which bone is dorsally dislocated?

- (A) Lunate
- (B) Scaphoid
- (C) Capitate
- (D) Hamate
- (E) Pisiform

- 25 Excision of thrombosed hemorrhoids is not recommended or effective after:

- (A) 12 hours
- (B) 24 hours
- (C) 48 hours
- (D) 96 hours
- (E) 1 week

- 26 What is the most common source of bleeding in an anterior nosebleed?

- (A) Anterior ethmoidal artery
- (B) Posterior ethmoidal artery
- (C) Kiesselbach plexus

- (D) Nasopalatine branch of sphenopalatine artery
- (E) Septal branch of superior labial artery

- 27 A 5-day-old neonate presents for routine follow-up. The child is acting normally. Funduscopic examination demonstrates bilateral retinal hemorrhages. Which of the following is the most likely cause?

- (A) Child abuse
- (B) Accidental fall
- (C) Normal birth trauma
- (D) Intracerebral hemorrhage
- (E) Congenital finding

- 28 A 26-year-old primigravida is diagnosed with a spontaneous abortion at 6 weeks' gestation. She asks you, "why did this happen?" Which of the following is the most common cause of first-trimester miscarriage?

- (A) Fetal chromosomal trisomy
- (B) Uterine structural abnormality
- (C) Maternal stress
- (D) Minor trauma, e.g., falls
- (E) Cigarette smoking

- 29 Which of the following is the most specific EKG finding in acute pericarditis?

- (A) Concave ST elevations
- (B) Convex ST elevations
- (C) PR depressions
- (D) Hyperacute T waves
- (E) Primary atrioventricular (AV) block

- 30 A 34-year-old man with a history of schizophrenia is brought to the ED by police with acute agitation. He was reported to be threatening passersby on the street. He now begins to threaten staff, stating that he will kill anyone who comes near him, and starts to swing punches at people standing near him. The patient is physically restrained by security staff and secured to a cart in four-point restraints. He is still yelling at the top of his lungs and struggling against the restraints. Which of the following is the most appropriate next step in management?

- (A) Observe for 4 hours and discharge when calm.
- (B) Observe for 1 hour and repeat history and physical examination.
- (C) CT scan of the brain without contrast.
- (D) Administer haloperidol, lorazepam, and benztropine.
- (E) Perform rapid sequence intubation.

- 31 A 44-year-old man is struck on the head with a baseball bat. A CT scan of the brain is shown in Figure 5-3. Which of the following is the most likely diagnosis?

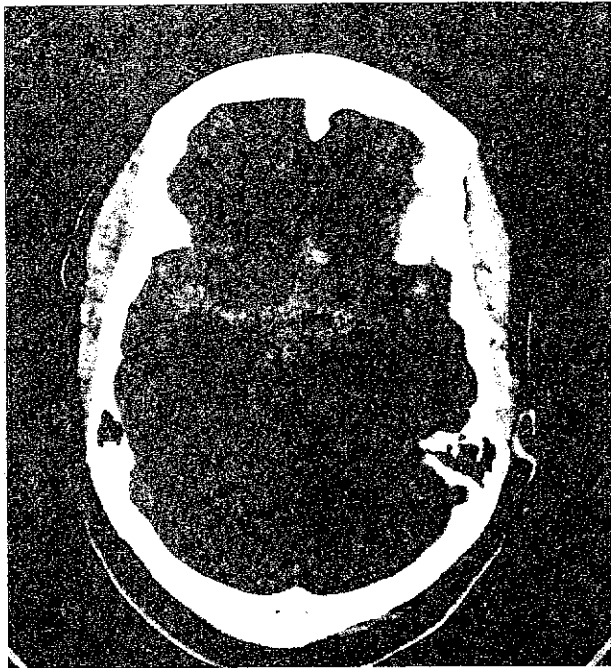


Figure 5-3.

- (A) Epidural hematoma
- (B) Subdural hematoma
- (C) Subarachnoid hemorrhage
- (D) Cerebral contusion
- (E) Diffuse axonal injury (DAI)

32 Which of the following is true regarding elder abuse?

- (A) Victims of elder abuse die earlier than elders who are not abused.
- (B) Men are at higher risk than women.
- (C) Sexual abuse is the most common type of elder abuse.
- (D) Most elder abuse reporting is performed by physicians.
- (E) Most perpetrators are strangers.

33 Which of the following is the preferred imaging modality to diagnose a parapharyngeal abscess in the ED?

- (A) Lateral neck x-ray
- (B) Anterior-posterior neck x-ray
- (C) CT scan of the neck
- (D) Magnetic resonance imaging (MRI) of the neck
- (E) Ultrasonography of the neck

34 Which of the following is true regarding the image shown in Figure 5-4?

- (A) The image depicts a Jones fracture.
- (B) Jones fractures and avulsion fractures are typically caused by a direct blow to the foot.

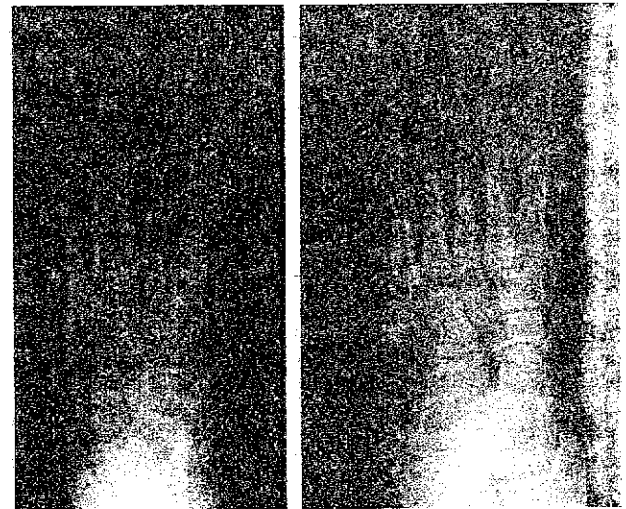


Figure 5-4.

- (C) There is a high rate of nonunion of the involved fracture.
- (D) The peroneus longus tendon inserts at the site of the fracture.
- (E) This patient should be allowed to bear weight as tolerated.

35 Which of the following is true regarding gonococcal septic arthritis?

- (A) Open surgical drainage is usually required.
- (B) It is more common in men than in women.
- (C) Genitourinary symptoms occur in most patients.
- (D) Synovial fluid Gram stain is positive more often than culture.
- (E) The hip is the most common joint affected.

36 The joints most commonly affected by decompression sickness (DCS) are

- (A) Ankles and feet.
- (B) Knees.
- (C) Hips and axial skeleton.
- (D) Shoulders and elbows.
- (E) Wrists and hands.

37 A 27-year-old man is hammering nails at a construction site without eye protection and feels something strike his right eye. After washing out the eye, he still complains of pain and presents to the ED. Which of the following is the safest and most accurate modality for locating the potential foreign body?

- (A) X-ray
- (B) Ultrasonography
- (C) MRI
- (D) CT scan
- (E) Nuclear medicine scan

38. Which of the following is a risk factor for development of kidney stones?
- (A) Female gender
 - (B) Hypoparathyroidism
 - (C) Crohn disease
 - (D) Hyperthyroidism
 - (E) Diabetes mellitus
39. Which of the following is the most common dysrhythmia in pediatric patients?
- (A) Atrial fibrillation
 - (B) Atrial flutter
 - (C) Complete heart block
 - (D) Paroxysmal supraventricular tachycardia (PSVT)
 - (E) Ventricular tachycardia
40. Which of the following is true regarding reduction of an anterior shoulder dislocation?
- (A) The Kocher maneuver is the most reliable method.
 - (B) Adequate muscle relaxation is the most important factor in successful reduction.
 - (C) The Hippocratic method should be the first one attempted.
 - (D) Scapular manipulation is the method of choice in third trimester pregnant patients.
 - (E) Intra-articular anesthetic injection is contraindicated.
41. The normal anion gap (AG) is primarily due to which of the following?
- (A) Phosphate
 - (B) Albumin
 - (C) Sulfate
 - (D) Citrate
 - (E) Acetone
42. Which of the following is true regarding lumbar puncture in patients with Guillain-Barré syndrome (GBS)?
- (A) *Campylobacter jejuni* can often be visualized in the cerebrospinal fluid (CSF) of patients with GBS.
 - (B) The classic CSF finding is an elevated protein level with a normal number of white blood cells.
 - (C) Lumbar puncture is necessary to make a diagnosis of GBS.
 - (D) Lumbar puncture is contraindicated in the acute phase of GBS due to elevated intracranial pressure (ICP).
 - (E) The finding of oligoclonal bands is pathognomonic for GBS.
43. Which of the following patients has a contraindication to the use of iodinated radiographic materials (RCMs)?
- (A) 24-year-old woman with asthma
 - (B) 60-year-old man on atenolol
 - (C) 37-year-old woman with a shellfish allergy
 - (D) 8-year-old boy with atopic dermatitis
 - (E) None of the above
44. A 35-year-old man with history of sickle cell disease presents with acute onset of fever, malaise, fatigue, and lightheadedness. Physical examination demonstrates a tachycardic patient with pale conjunctivae. You suspect aplastic crisis and draw a complete blood count with reticulocyte count. You review his old records and note that the patient's baseline hemoglobin level is 8 g per dL. Which of the following laboratory abnormalities is most consistent with an aplastic crisis?
- (A) Hemoglobin 8 g per dL, reticulocyte count 6%
 - (B) Hemoglobin 8 g per dL, reticulocyte count 1%
 - (C) Hemoglobin 6 g per dL, reticulocyte count 6%
 - (D) Hemoglobin 6 g per dL, reticulocyte count 1%
 - (E) Hemoglobin 4 g per dL, reticulocyte count 6%
45. Which of the following is true regarding inflammatory bowel disease?
- (A) Toxic megacolon is more common in patients with Crohn disease than ulcerative colitis.
 - (B) Perianal complications are most common in patients with Crohn disease.
 - (C) Crohn disease always involves the rectum.
 - (D) Erythema nodosum is most common in male patients with ulcerative colitis.
 - (E) Anal fissures in patients with Crohn disease tend to be located in the posterior midline.
46. A 42-year-old woman presents with a chief complaint of right hand numbness. Decreased sensation in the volar aspect of the little finger indicates a problem in which of the following?
- (A) Radial nerve
 - (B) C5 nerve root
 - (C) Ulnar nerve
 - (D) Median nerve
 - (E) C6 nerve root
47. Which of the following is the strongest environmental risk factor for the development of pancreatic cancer?
- (A) Alcohol use
 - (B) High fat diet
 - (C) Excessive coffee drinking

- (D) Living in a cold weather environment
(E) Cigarette smoking
- 48 A 38-year-old mildly obese primigravida at 34 weeks' gestation presents with a chief complaint of "swollen legs" and abdominal pain. Her blood pressure is 170/100 and she has 3+ protein on urine dipstick. After giving her magnesium for prophylaxis of her seizures and hydralazine for blood pressure control, the nurse tells you that her urine output seems a bit low, and asks you what you want to do about her significant edema. The next best step in management is
- (A) Furosemide 40 mg IV push.
(B) Maintenance intravenous fluids.
(C) Hydrochlorothiazide 25 mg orally.
(D) Mannitol 0.5 mg per kg IV push.
(E) 25% albumin given intravenously at 1 g per kg.
- 49 The "discriminatory zone" is the quantitative serum β -hCG level at which a normal intrauterine gestation should be seen on ultrasonography. The discriminatory zone for transvaginal ultrasonography is
- (A) <500 mIU per mL β -hCG.
(B) 500 to 1,000 mIU per mL β -hCG.
(C) 1,000 to 2,000 mIU per mL β -hCG.
(D) 2,000 to 3,000 mIU per mL β -hCG.
(E) >3,000 mIU per mL β -hCG.
- 50 Which of the following is true regarding diagnosis of kidney stones?
- (A) Normal urinalysis essentially rules out the diagnosis.
(B) KUB radiograph has >90% specificity.
(C) Most kidney stones are radiolucent.
(D) Ultrasonography has >90% sensitivity.
(E) CT scan has roughly 90% sensitivity and specificity.
- 51 The most common manifestation of barotrauma associated with scuba divers during descent is
- (A) Nitrogen narcosis.
(B) Barosinusitis.
(C) Temporomandibular joint dysfunction.
(D) Facial barotrauma.
(E) Middle ear barotrauma.
- 52 Which of the following is a potential complication of *Bordetella pertussis* infection?
- (A) Pneumonia
(B) Subconjunctival hemorrhage
(C) Pneumothorax
(D) Otitis media
(E) All of the above
- 53 Which of the following is the most common cause of nongonococcal urethritis?
- (A) *Ureaplasma*
(B) *Trichomonas*
(C) *Hemophilus ducreyi*
(D) *C. trachomatis*
(E) Herpes simplex virus
- 54 What is the most common source of bleeding in a posterior nosebleed?
- (A) Anterior ethmoidal artery
(B) Posterior ethmoidal artery
(C) Kiesselbach plexus
(D) Nasopalatine branch of sphenopalatine artery
(E) Septal branch of superior labial artery
- 55 A 9-year-old girl is brought in to the ED with a chief complaint of a palpable, nonblanching rash, achy knee and ankle pain, and colicky abdominal pain (see Fig. 5-5). Which of the following is true?

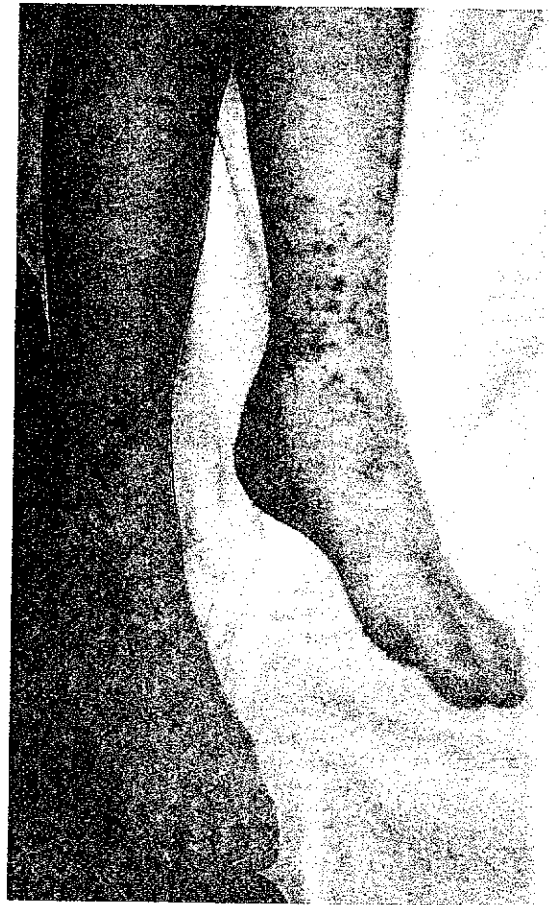


Figure 5-5.

- (A) Renal involvement, with progression to renal failure, is common.

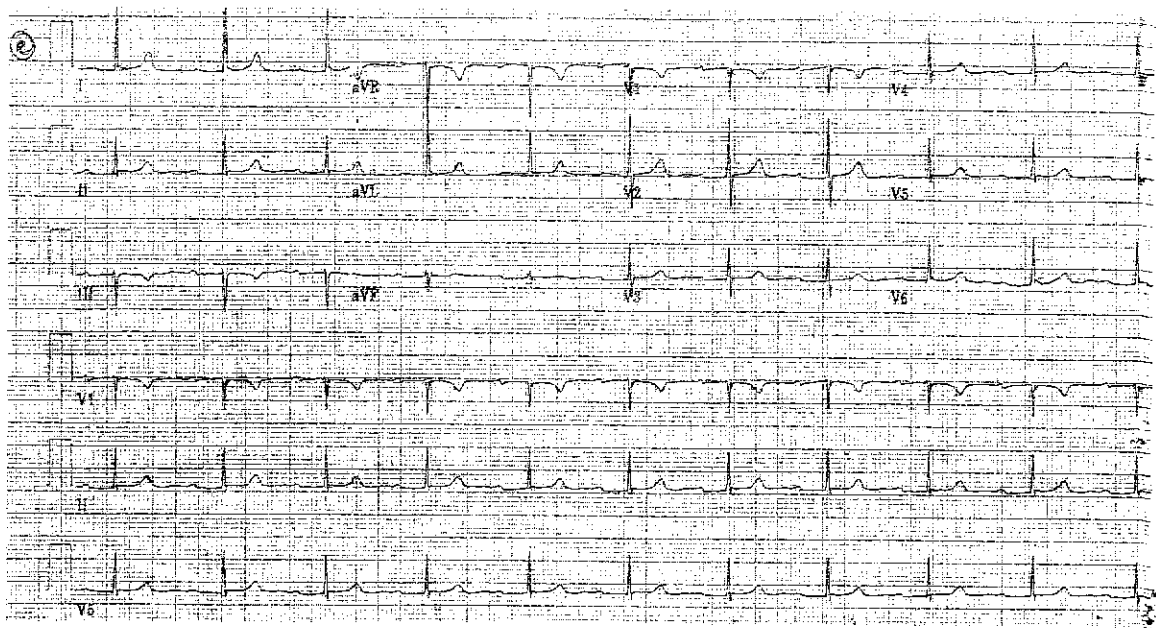


Figure 1-1.

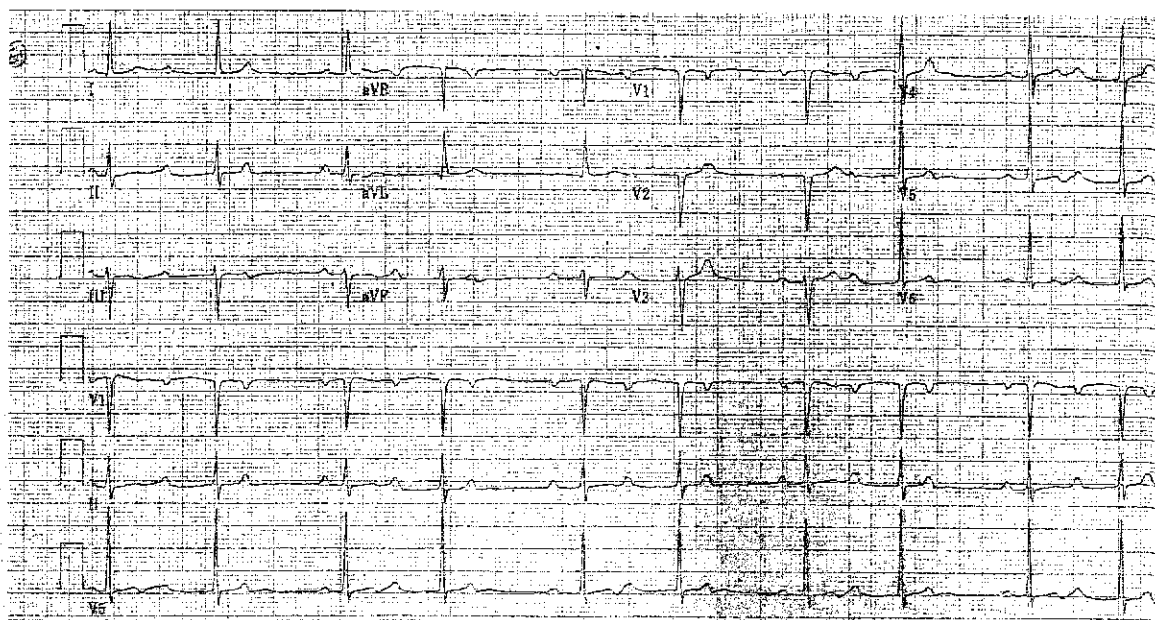


Figure 1-5.

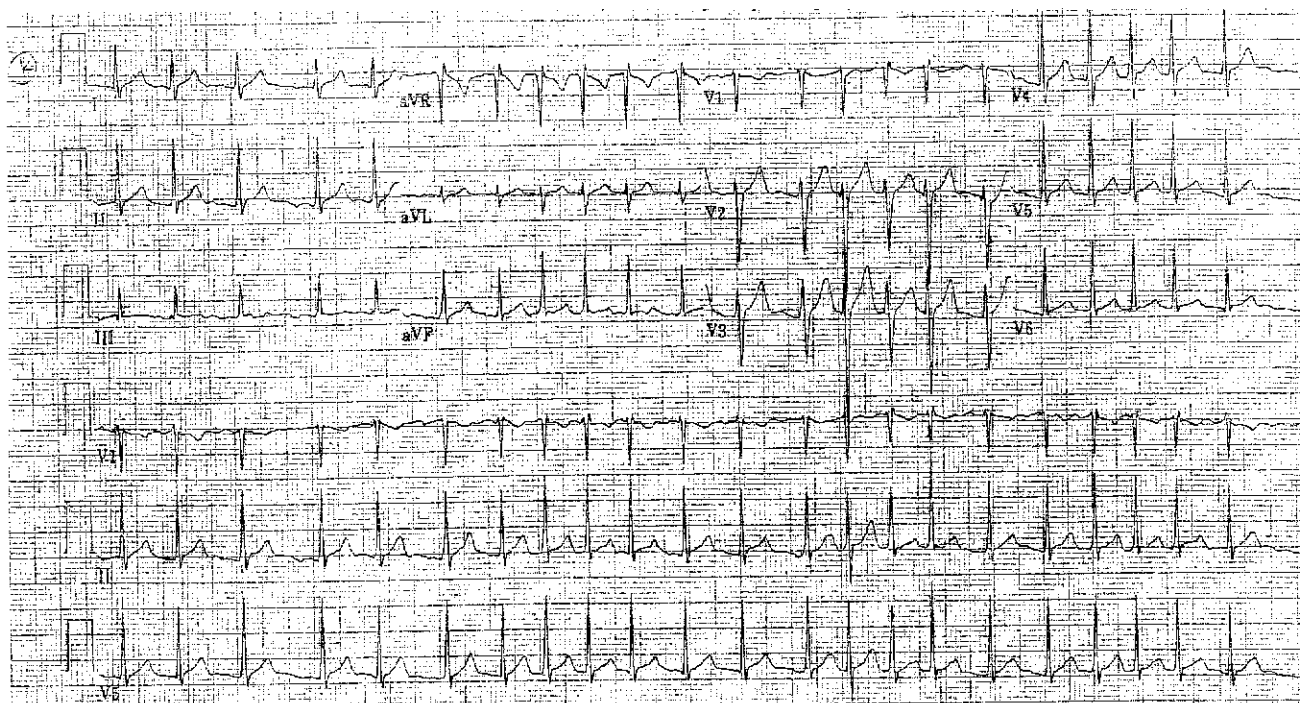


Figure 3-1.



Figure 3-11. Figure from: Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 2001, with permission.

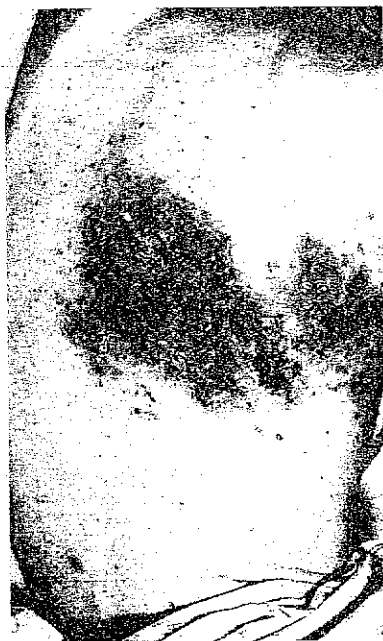


Figure 4-6. Figure reprinted with permission from Weber J. *Health assessment in nursing*, 2nd ed. Lippincott Williams & Wilkins; 2002.

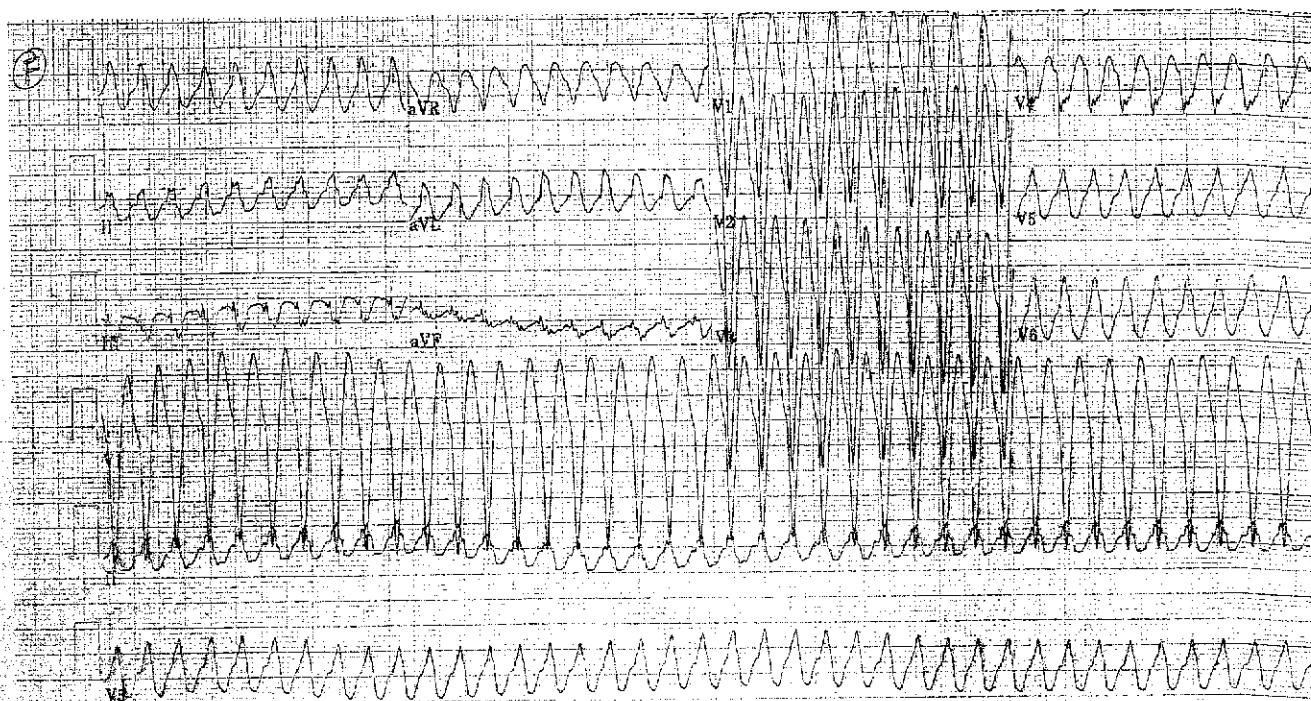


Figure 4-10.



Figure 6-9.

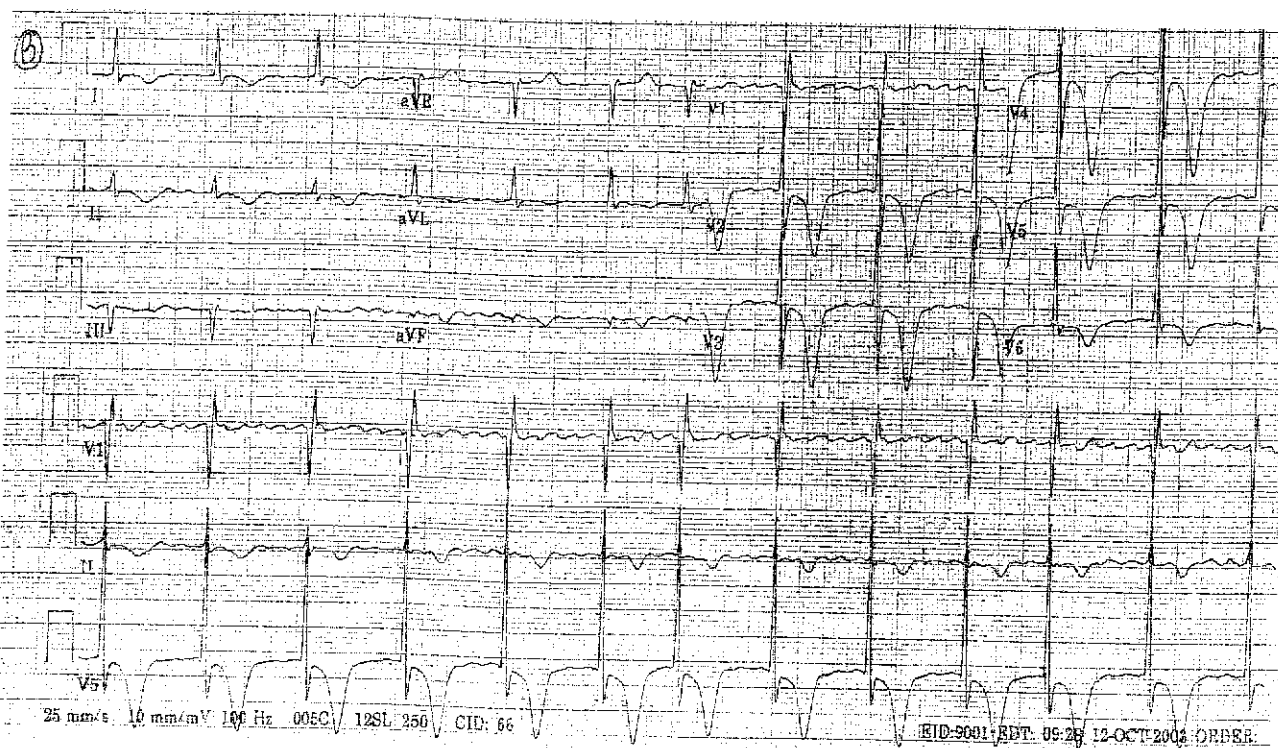


Figure 7-8.



Figure 7-9. Figure reprinted with permission from Pillitteri A. *Maternal and child health nursing*. Lippincott Williams & Wilkins; 2006.

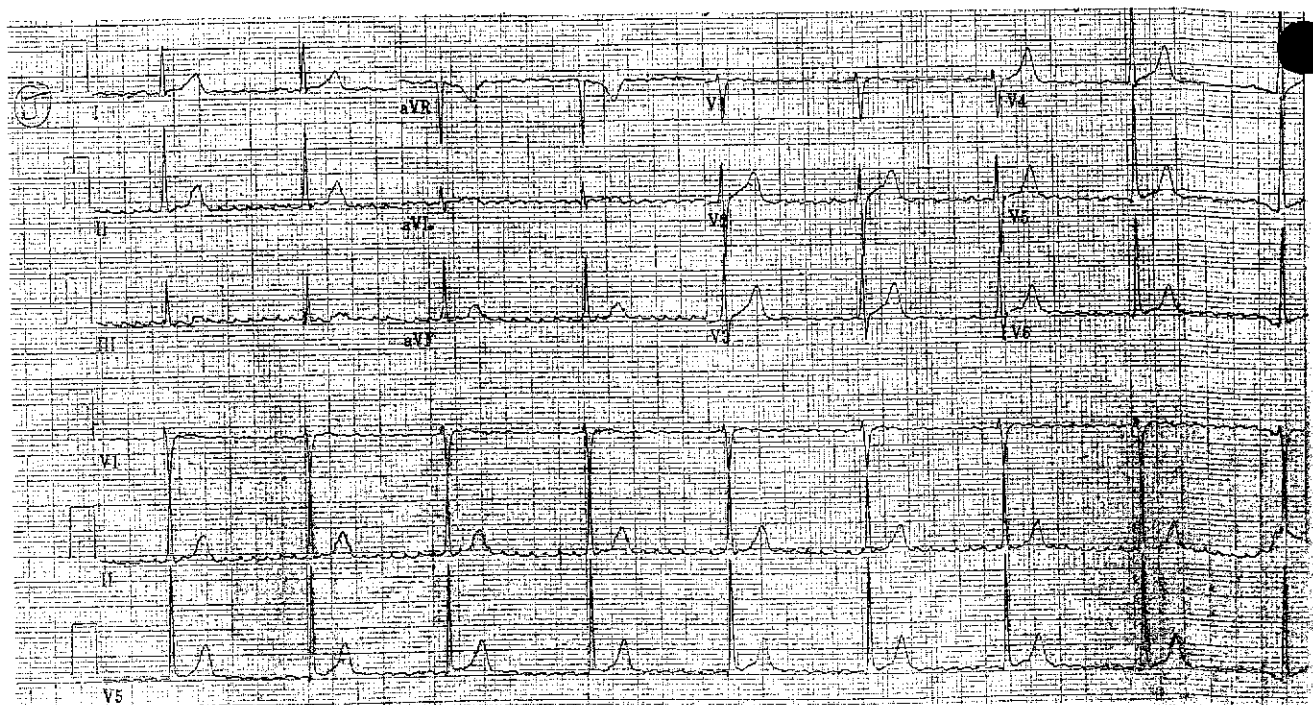


Figure 8-3.



Figure 8-5. Figure reprinted with permission from Fleisher GR. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003.

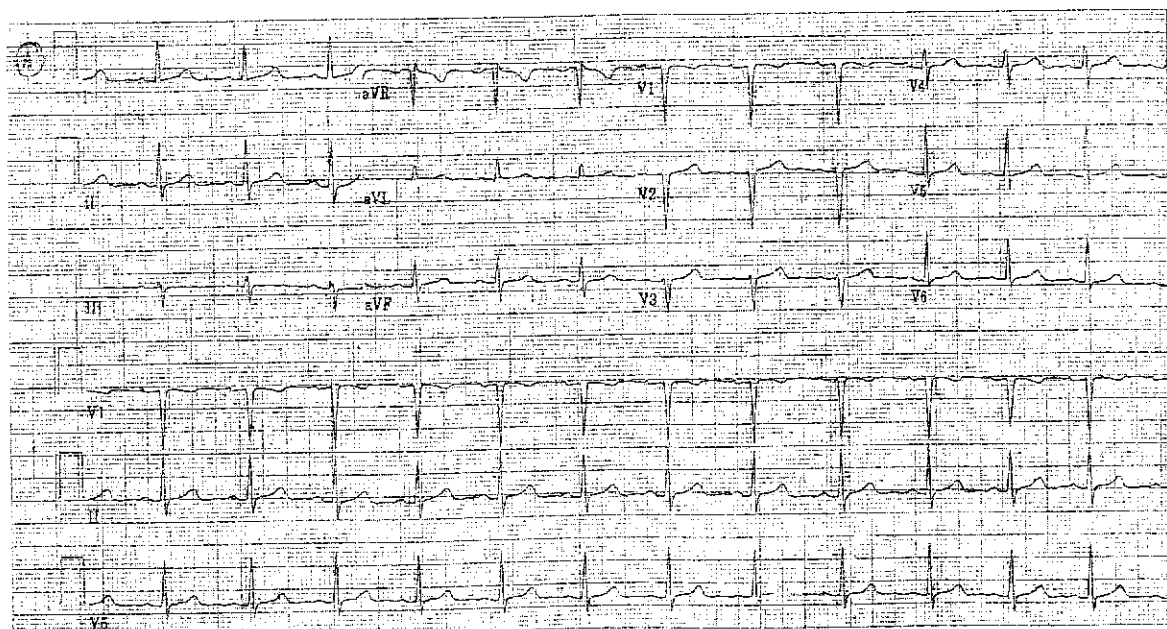


Figure 9-4.

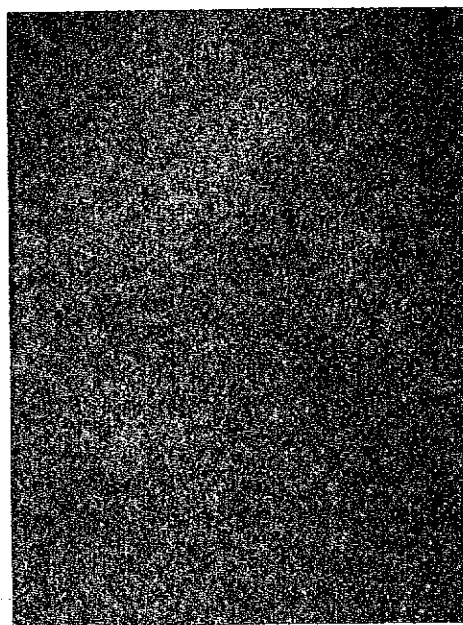


Figure 10-11. Figure reprinted with permission from Barankin B. *Stedman's illustrated dictionary of dermatology eponyms*. Lippincott Williams & Wilkins; 2004.

- (B) Most patients have thrombocytopenia.
 (C) Treatment is with high-dose aspirin.
 (D) Intussusception complicating this illness is usually ileoileal.
 (E) Most patients require inpatient immunosuppressive therapy.
- 56 Which of the following is the most useful treatment modality in patients with heat stroke?
- (A) Spraying tepid water on the patient and fanning the patient
 (B) Intravenous dantrolene
 (C) Applying ice packs to the axilla, groin, and extremities
 (D) Delivery of cooled intravenous saline
 (E) Tylenol or ibuprofen delivered per rectum
- 57 Which of the following is true about volvulus?
- (A) Plain films are more often diagnostic in cases of cecal volvulus than sigmoid volvulus.
 (B) Reduction of cecal volvulus is best achieved endoscopically.
 (C) One of the classic radiographic findings in cecal volvulus is a massively dilated cecum located in the left upper quadrant.
 (D) Cecal volvulus is more common than sigmoid volvulus.
 (E) Cecal volvulus is most common in patients aged 25 to 35 years.
- 58 Which of the following is true about ischemic colitis?
- (A) The mortality rate is similar to that for acute ischemia of the small bowel.
 (B) "Thumbprinting" on plain radiographs is seen in only 50% of cases.
 (C) The disease is usually isolated to the cecum.
 (D) The diagnosis of colon ischemia is commonly confused with ulcerative colitis.
 (E) Angiography should be performed as soon as the diagnosis is considered.
- 59 Which of the following is true regarding viral hepatitis?
- (A) Ten percent of adult patients infected with acute hepatitis A become chronic carriers.
 (B) Pregnant women infected with acute hepatitis E are more susceptible to fulminant hepatitis.
 (C) Children infected with hepatitis A virus develop symptoms more often than adults.
 (D) Hepatitis B is the most common cause of viral hepatitis worldwide.
 (E) Although hepatitis A primarily undergoes fecal-oral transmission, percutaneous transmission occurs at similar rates to hepatitis B.
- 60 A complaint that may help differentiate patients with Crohn disease from patients with irritable bowel syndrome is
- (A) Nocturnal diarrhea.
 (B) Bloating.
 (C) Weight loss.
 (D) Colicky abdominal pain.
 (E) Bilious vomiting.
- 61 A 4-year-old boy is brought to your office by parents with a fever to 102°F over the last 2 days, malaise, and complaint of right ear pain. Examination reveals an active, febrile child with a bulging right tympanic membrane (TM) minimally mobile on insufflation. Which of the following is the most likely pathogen?
- (A) *Mycoplasma pneumoniae*
 (B) *S. pyogenes*
 (C) *Moraxella catarrhalis*
 (D) *Hemophilus influenzae*
 (E) Adenovirus
- 62 A 27-year-old man is brought to the ED after a motor vehicle accident complaining of right arm pain. His

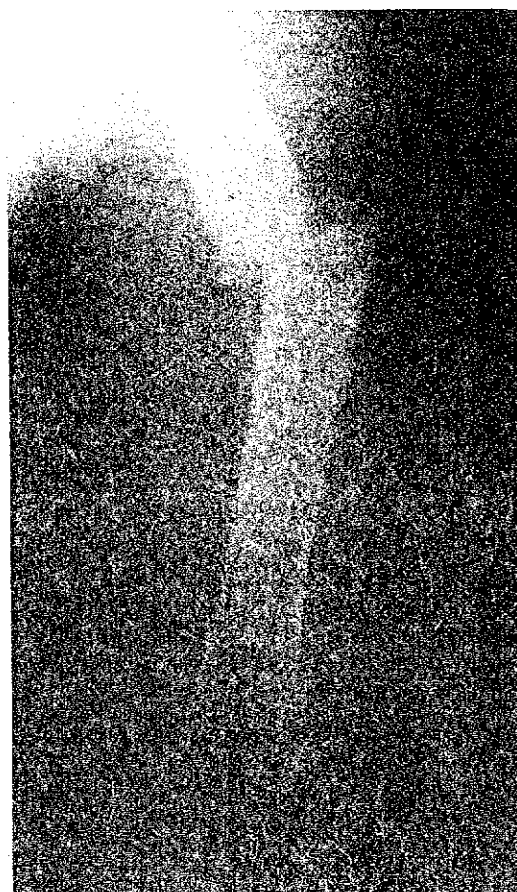


Figure 5-6.

arm is swollen and shortened compared with the unaffected side. His x-ray reveals the image shown in Figure 5-6. Which of the following associated findings is most likely to be present upon physical examination?

- (A) Inability to extend the wrist
- (B) Loss of two-point discrimination at the volar tip of the index finger
- (C) Absence of a radial pulse
- (D) Inability to oppose the thumb
- (E) Hypoesthesia of the palmar aspect of the little and ring fingers

63 Which of the following is the narrowest portion of the pediatric airway?

- (A) Nasopharynx
- (B) Oropharynx
- (C) True cords
- (D) False cords
- (E) Cricoid cartilage

64 Which of the following is true regarding tinea versicolor?

- (A) Recurrence of lesions after treatment is common.
- (B) Sunlight accelerates repigmentation.
- (C) Griseofulvin is inactive against the disease.
- (D) The upper trunk is the most commonly affected area.
- (E) All of the above.

65 Which of the following is true regarding thyroid storm?

- (A) Glucocorticoids may be useful in management.
- (B) Apathetic thyrotoxicosis is an uncommon presentation that typically occurs in children.
- (C) Most patients have underlying Hashimoto thyroiditis.
- (D) Atrial fibrillation is the most common dysrhythmia.
- (E) All of the above.

66 Which of the following is the most common complication of anterior shoulder dislocation?

- (A) Axillary nerve injury
- (B) Brachial artery injury
- (C) Recurrence
- (D) Rotator cuff tear
- (E) Adhesive capsulitis

67 A 5-year-old girl without past medical history presents with fever and pruritic rash on several areas of her trunk. The parents report a sick contact with similar symptoms at school and think the rash may be

chicken pox. There is no reported cough, shortness of breath, headache, or stiff neck. Physical examination demonstrates a nontoxic, playful child with a crop of vesicles in one area and dried crusted lesions in other areas. Which of the following is the most appropriate next step in management?

- (A) Aspirin
- (B) Acetaminophen
- (C) IV acyclovir
- (D) Varicella-Zoster vaccine
- (E) Varicella-Zoster immune globulin

68 A 46-year-old man presents with chest pain 8 hours after having upper endoscopy for dysphagia (see Fig. 5-7). Esophageal perforation is suspected and a screening chest x-ray is ordered. Which of the following is likely to be found on physical examination?



Figure 5-7.

- (A) Diffusely diminished heart sounds
- (B) Decreased breath sounds at lung bases bilaterally
- (C) Shock
- (D) A crunching sound upon cardiac auscultation
- (E) A rigid, tender abdomen

69 A 23-year-old man presents with right ankle pain. He twisted it playing basketball and has been unable to walk. Physical examination demonstrates tenderness in his medial malleolus and proximal fibula. Radiographs demonstrate a nondisplaced medial malleolus fracture with nondisplaced proximal fibular fracture

Which of the following is the most appropriate next step in management?

- (A) MRI of the knee
- (B) MRI of the ankle
- (C) Stress x-rays of the ankle
- (D) Discharge with knee immobilizer and nonweight bearing
- (E) Discharge with Aircast

70 Which of the following is true regarding cerebral venous thrombosis (CVT)?

- (A) CT with IV contrast is the current "gold standard" for diagnosis of CVT.
- (B) The most common presentation is lethargy.
- (C) In most cases the outcome of CVT is worse than arterial stroke.
- (D) Men are more commonly affected than women.
- (E) Most seizures that occur are focal seizures.

71 A 19-year-old boy presents with acute onset of right testicular pain and nausea for 5 hours. Physical examination reveals a markedly swollen and tender testis in a horizontal lie with absent right cremasteric reflex. Which of the following is the most appropriate definitive management?

- (A) Antibiotics
- (B) Analgesia
- (C) Manual detorsion
- (D) Operative orchidopexy
- (E) Extracorporeal shockwave lithotripsy

72 Which of the following is true about fungal pulmonary disease?

- (A) Most cases of primary pulmonary infection with *Histoplasma capsulatum* are undetected and resolve without treatment.
- (B) *Cryptococcus neoformans*, *Blastomyces dermatitidis*, *H. capsulatum*, and *Coccidioides immitis* all have a specific geographic distribution.
- (C) Patients with fungal pneumonia are generally contagious to other patients.
- (D) Fungal pneumonias generally cause acute, self-limiting illness in healthy patients.
- (E) *C. immitis* pulmonary infection most commonly results in disseminated disease.

73 A 24-year-old woman presents with persistent cough for 4 weeks. She had upper respiratory infection (URI)-like symptoms 2 weeks before and then developed a persistent cough for the next month. She states she has had coughing fits many times during the day and "couldn't stop coughing" for almost a minute when she started. Which of the following is true regarding this patient?

- (A) The disease is caused by a gram-negative coccobacillus.
- (B) Antibiotic therapy should eliminate the symptoms within a few days.
- (C) Bacterial culture is indicated to confirm the diagnosis.
- (D) The disease is not contagious.
- (E) Mortality is close to 30%.

74 Which of the following is true regarding viral hepatitis?

- (A) Adult patients infected with acute hepatitis B are more likely to become chronic carriers than patients infected with acute hepatitis C.
- (B) Hepatitis C is most commonly acquired through sexual intercourse with an infected person.
- (C) Hepatitis C is the most common viral cause of fulminant hepatic failure.
- (D) Both direct and indirect bilirubin are typically elevated in roughly equal amounts.
- (E) Leukocytosis is a harbinger of fulminant hepatic failure.

75 A 24-year-old man is brought to the ED for altered mental status. A friend states that they were eating the seeds of the fruit shown in Figure 5-8. Vital signs are 99.6°F, 100, 18, 156/94, 98% RA. The patient is agitated, responds only to name, but has intact airway reflexes. Which of the following is the most appropriate next step in management?

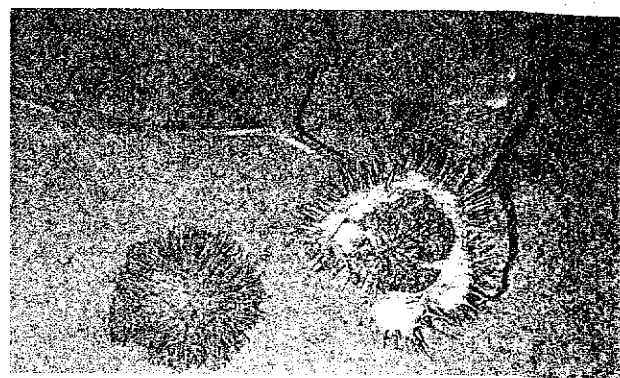


Figure 5-8.

- (A) Atropine
- (B) Pyridostigmine
- (C) Edrophonium
- (D) Pralidoxime
- (E) Supportive care only

- 76** A 22-year-old woman presents with acute onset of right eye discharge 3 hours before presentation. The discharge reaccumulates almost immediately after wiping it away. She does not wear contact lenses. Physical examination demonstrates normal visual acuity and copious greenish-yellow discharge in the right eye. Conjunctival injection and chemosis are prominent. Which of the following is the most likely cause?
- (A) *S. pneumoniae*
 - (B) *H. influenzae*
 - (C) *M. catarrhalis*
 - (D) *Klebsiella pneumoniae*
 - (E) *N. gonorrhoeae*
- 77** The most common cause of acute liver failure is
- (A) Acetaminophen toxicity.
 - (B) Idiopathic.
 - (C) Hepatitis B virus infection.
 - (D) *Amanita phalloides* ingestion.
 - (E) Reye syndrome.
- 78** A 56-year-old man with a history of uncontrolled hypertension is brought in to the ED unresponsive after being found slumped over the steering wheel of his car. His BP is 245/130, his HR is 62 and he has irregular breathing. On examination, you note that his left pupil is fixed and dilated. What does this physical examination finding likely indicate?
- (A) Tonsillar herniation
 - (B) Uncal herniation
 - (C) Subfalcine herniation
 - (D) Sphenoid herniation
 - (E) None of the above
- 79** Which of the following is the most appropriate crystalloid of choice during trauma resuscitations?
- (A) D10 W
 - (B) D10 0.9 N NaCl
 - (C) D5 0.9 N NaCl
 - (D) 0.45 N NaCl
 - (E) Lactated Ringers
- 80** The most common cause of esophageal perforation is
- (A) Caustic ingestion.
 - (B) Boerhaave syndrome.
 - (C) Trauma.
 - (D) Iatrogenic.
 - (E) Esophageal cancer.
- 81** Which of the following is true regarding urethritis in men?
- (A) Gonococcal infection is almost always symptomatic.
 - (B) Gonococcal and chlamydial infection rarely coexist.
 - (C) Gram-negative intracellular diplococci on urinalysis and Gram stain indicate *Escherichia coli* infection.
 - (D) Chlamydial infection is more common in men older than 35 years.
 - (E) First-line therapy is with amoxicillin.
- 82** Which of the following is the most appropriate test in a patient with an intermediate probability of a PE by Wells criteria?
- (A) Lung scintigraphy (ventilation-perfusion [V/Q] scan)
 - (B) D-dimer
 - (C) CT pulmonary angiography
 - (D) Lower extremity Doppler ultrasonography
 - (E) Arterial blood gas
- 83** Which of the following is true regarding cerebral edema after head trauma?
- (A) Vasogenic edema usually occurs in the gray matter.
 - (B) Vasogenic edema occurs because of membrane pump failure.
 - (C) Cytotoxic edema develops when cerebral blood flow is reduced.
 - (D) Cytotoxic edema rarely occurs in the absence of vasogenic edema.
 - (E) The presence of cerebral edema mandates operative management.
- 84** A 47-year-old noncompliant man with hypertension and hyperlipidemia presents with a history of 10 minutes of weakness on the right side of his body that has since resolved. His workup in the ED is normal but you decide to admit him with a diagnosis of transient ischemic attack (TIA). Which of the following should be included in his treatment in the ED?
- (A) Clopidogrel
 - (B) Ticlopidine
 - (C) Heparin
 - (D) Aspirin
 - (E) Warfarin
- 85** Which of the following is the most common cardiac rhythm in patients with PE?
- (A) Normal sinus rhythm
 - (B) Atrial fibrillation
 - (C) Atrial flutter
 - (D) Ventricular tachycardia
 - (E) Sinus tachycardia

86 Which of the following is the strongest risk factor for developing an abdominal aortic aneurysm (AAA)?

- (A) Age younger than 50
- (B) Obesity
- (C) Female gender
- (D) Hypertriglyceridemia
- (E) First-degree relative with AAA

87 Which of the following pediatric heart diseases causes cyanosis?

- (A) Mitral stenosis
- (B) Coarctation of the aorta
- (C) Transposition of the great vessels
- (D) ASD
- (E) VSD

88 A 26-year-old woman presents to the ED with ankle pain. She was playing tag with her kids in the yard when her foot got caught in an open pipe, snapping it outward as she fell to the ground. The squeeze test produces pain at the ankle and her x-ray is shown in Figure 5-9. Which of the following is true?



Figure 5-9.

- (A) This is a stable injury.
- (B) The deltoid ligament is probably intact.
- (C) The syndesmosis is probably intact.
- (D) This is a Maisonneuve fracture.
- (E) None of the above.

89 Which of the following class of drugs is considered first-line therapy for most anxiety disorders?

- (A) β -Blockers
- (B) Antipsychotics

- (C) Selective serotonin reuptake inhibitors (SSRIs)
- (D) Tricyclic antidepressants
- (E) Mood stabilizers

90 Which of the following is true regarding ischemic stroke and cerebral edema?

- (A) Herniation in large strokes resulting from cerebral edema is more common in young patients than in elderly patients.
- (B) The effects of hyperventilation on reducing ICP last for up to 1 week.
- (C) Methylprednisolone should be given to all stroke patients with evidence of edema on CT.
- (D) Cerebral edema due to ischemic stroke peaks within 2 to 4 hours.
- (E) None of the above.

91 A 34-year-old man presents with severe left knee pain after a motor vehicle collision. He has a large joint effusion and his knee is unstable in all directions. Plain radiographs demonstrate no fracture. Pulses in the left lower extremity are normal. Which of the following is the most appropriate next step in management?

- (A) Discharge with no weight bearing
- (B) MRI knee
- (C) Angiography
- (D) CT knee
- (E) Arthroscopy

92 A 22-year-old man is dropped off by friends at the ED after being stabbed three times in the abdomen. The most likely structure to be injured is the:

- (A) Liver.
- (B) Small intestine.
- (C) Spleen.
- (D) Colon.
- (E) Diaphragm.

93 The most common cause of infectious esophagitis is

- (A) *Candida* species.
- (B) Herpes simplex virus 1.
- (C) Cytomegalovirus.
- (D) *Helicobacter pylori*.
- (E) *Pneumocystis* species.

94 Which of the following is a classic symptom of a hydatidiform mole?

- (A) Pregnancy-induced hypertension occurring during the first trimester
- (B) Uterine enlargement greater than expected for gestational dates
- (C) Abnormal vaginal bleeding
- (D) Hyperemesis gravidarum
- (E) All of the above

- 95 A 22-year-old Latino-man who recently emigrated from Mexico presents to the ED with fever, chills, abdominal pain, and intermittent nausea and vomiting. A CT scan of his abdomen is shown in Figure 5-10. Which of the following is true?



Figure 5-10.

- (A) This condition requires immediate surgical drainage.
 (B) Transmission is typically fecal-oral.
 (C) Infections are usually polymicrobial.
 (D) Hyperbilirubinemia is the most commonly abnormal laboratory finding.
 (E) All of the above.
- 96 An 8-year-old boy presents with right ear pain after a fight. He tells you that he was punched and kicked in the head and ear. On examination, you note the finding visible in the image (see Fig. 5-11). Which of



Figure 5-11.

the following is the best step in management? The remainder of the patient's examination is normal.

- (A) Incision and drainage followed by application of a pressure dressing
 (B) Referral to otolaryngology with follow-up arranged in 2 days
 (C) Reassurance and discharge
 (D) Application of a pressure dressing only
 (E) Aspiration followed by application of a pressure dressing
- 97 A 5-year-old boy is brought for evaluation of penile erythema. He is uncircumcised and has erythema, edema, and a semisolid discharge around the glans without accompanying phimosis or paraphimosis. He has had several similar episodes in the past with identification of yeast. Which of the following is the most appropriate diagnostic test?
- (A) Liver function tests
 (B) Postvoid residual
 (C) Intravenous pyelogram
 (D) Serum glucose
 (E) Retrograde urethrogram
- 98 A 78-year-old man with history of diabetes presents with fever and shortness of breath. He has had progressively worsening fatigue and cough over the last few days and developed acute onset of fever, shaking chills, and difficulty breathing today. His vitals are: 101.5°F, 132, 30, 87/44, 88% RA. Physical examination reveals right lower lung field crackles, and a chest x-ray demonstrates a right lower lobe infiltrate. After 3 L of isotonic fluids and appropriate antibiotic therapy, his vital signs are unchanged. Which of the following is the most appropriate therapy for this patient?
- (A) Mechanical ventilation
 (B) Tube thoracostomy on the right
 (C) Percutaneous transluminal coronary angioplasty
 (D) Immediate surgical consultation
 (E) Potassium chloride infusion
- 99 A 25-year-old previously healthy black woman presents to the ED complaining of a facial rash over her nose, mild fever, and achy wrists. She just returned from an annual weekend trip to the Florida beaches with a bunch of girlfriends. Which of the following is the most sensitive test to aid in her diagnosis?
- (A) Rheumatoid factor (RF)
 (B) Anti-Smith antibody (anti-Sm)
 (C) Antidouble stranded deoxyribonucleic acid antibody (anti-dsDNA)

- (D) Antisingle strand deoxyribonucleic acid antibody (anti-ssDNA)
- (E) Antinuclear antibody (ANA)

100 Which of the following is the most common symptom seen in pulmonary tuberculosis (TB)?

- (A) Weight loss
- (B) Night sweats
- (C) Shortness of breath
- (D) Chest pain
- (E) Hemoptysis

Answers and Explanations

Answer D. Patients with fall on outstretched hand (FOOSH) injuries may have bony or ligamentous damage in any part of their upper extremity. Most susceptible to injury are the bones of the wrist. The anatomic snuffbox is demarcated by the extensor pollicis brevis and longus tendons just proximal to the thumb and tenderness in this region indicates possible fracture to the scaphoid. Scaphoid fracture is particularly dangerous because of the high rate of avascular necrosis (AVN) and resulting limitation of thumb function. Almost one fifth of all scaphoid fractures are invisible on acute radiographs, so appropriate management in suspected cases includes immobilization in a thumb spica cast and repeat radiographs in 1 to 2 weeks. There is no need for emergent orthopaedic consultation in patients with negative x-rays. Discharging the patient home without a splint that immobilizes the thumb is contraindicated. Admission for observation is not an appropriate use of resources.

Answer C. Diffuse axonal injury (DAI) is an important traumatic cause of coma that is not due to a mass lesion or frank intracerebral hemorrhage. Initial CT scan is almost always normal in patients with DAI, but MRI may show diffuse white matter disruption due to axonal fiber injury. Because of the difficulty in gauging DAI on neuroimaging, the prognosis is based totally on clinical parameters. The duration of coma obviously correlates with severity of injury. Patients with DAI who awaken from coma within 24 hours may have few permanent disabilities. Those in coma for longer than 24 hours tend to have much more grim outcomes, including persistent vegetative state or extreme cognitive dysfunction. Most types of acute intracranial hemorrhage severe enough to lead to coma would be evident on initial CT scan, including epidural or subdural hematomas, cerebral contusions, and intraparenchymal hematoma. An important exception is subarachnoid hemorrhage, which may not be visible on CT scan and is a common hemorrhagic cause of altered mental status after trauma.

Answer B. This patient's anion gap (AG) is 12, which is normal. Assuming that the patient has a normal albumin concentration (the major contributor to the AG in healthy patients), the normal AG reflects a resolution of the ketoacidosis. If substantial ketoacids were still present, the AG would be persistently elevated and the patient would require

an ongoing insulin infusion. The persistently low bicarbonate signifies that a metabolic acidosis is still present, but it is an HCMA (nonanion gap). The development of an HCMA is a common complication of DKA therapy. This is partly due to the infusion of a large volume of saline, which contains chloride in concentrations far greater than plasma (154 mEq per L). Another major contributor is the loss of ketone anions in the urine that would normally serve as precursors for bicarbonate regeneration. The development of HCMA is benign and requires no therapy. In the setting of normal renal function, it will resolve spontaneously over the next 24 hours due to increased renal acid secretion. Subcutaneous insulin should always be overlapped with an insulin infusion when discontinuing continuous insulin therapy.

Answer A. The patient has evidence of Henoch-Schönlein purpura (HSP), an immune-mediated vasculitis of idiopathic origin. Young children are the highest risk group. Dermatologic, gastrointestinal, renal, and musculoskeletal findings are seen. The rash of HSP is characteristic: a maculopapular eruption on the legs and buttocks and almost never involving the upper extremities or trunk. Abdominal pain is due to intestinal vasculitis or intussusception, which occurs with higher frequency in patients with HSP than the normal population. Renal involvement may be due to glomerulonephritis, which is detected as hematuria on urinalysis. Current management of HSP involves potential administration of corticosteroids or intravenous immunoglobulin (IVIG) to prevent and treat glomerulonephritis. Abdominopelvic CT scan is not indicated, as HSP is a clinical diagnosis. Despite the possibility of HSP as an immune-mediated response to streptococcal infection, ASO titers are not routinely indicated, as they do not change management. Blood cultures are not necessary in these patients except when systemic infection is suspected by fever and focal abdominal tenderness. A Meckel scan is used to detect the presence of Meckel diverticulum, which usually presents with painless rectal bleeding rather than the constellation of signs seen in HSP.

Answer B. Owing to its deceptively innocuous early course, the diagnosis of acute mesenteric ischemia (AMI) remains problematic. Therefore, the mortality rate has remained essentially unchanged at roughly 70%. The key to diagnosis is recognizing patients at risk, such as any patient older than 50 years of age who presents with acute abdominal

pain and who has known vascular disease, cardiac arrhythmias, recent myocardial infarction, hypovolemia, hypotension, or sepsis. The most commonly cited clinical finding is pain that is out of proportion to tenderness elicited on physical examination. This is a nonspecific finding that needs to be considered carefully in light of the clinical scenario. Unfortunately, there are no laboratory markers or radiologic studies apart from angiography that have sufficient sensitivity and specificity to exclude AMI early in its course. Lactate levels are elevated in approximately 100% of patients with bowel infarction, but this is a late finding and mortality rates are high by the time infarction has occurred. Plain films are most commonly nonspecific, although findings such as ileus correspond to more severe disease and a higher mortality rate. The sensitivity of CT has been cited to be as high as 82%, but the most common early finding is bowel wall thickening, present in 26% to 96% of cases. Unfortunately, this is also the least specific finding and is often not present in mesenteric ischemia due to arterial embolism or thrombosis, which is the most common cause of AMI. Pneumatosis intestinalis or gas in the portal venous system is a specific finding but is only present after bowel infarction has occurred. In the absence of angiography, the treatment is emergent laparotomy.

5 Answer D. Both bacteriuria and urinary tract infection (UTI) should be treated aggressively in pregnant women, as they can cause serious complications with delivery. The prevalence of bacteriuria may be higher pregnant women than in nonpregnant women, but UTI rates are comparable. Symptoms are identical between the two groups. Gram-negative enteric bacteria cause the vast majority of UTIs in pregnant women, but a crucial organism to consider is Group B *Streptococcus*, which can cause serious neonatal infection. Nitrofurantoin, penicillins, and cephalosporins are the drugs of choice. Sulfonamides are not safe during the third trimester because of the possibility of neonatal hemolysis. Fluoroquinolones cause various congenital defects. Although amoxicillin would be a reasonable choice in most patients, the allergy to penicillin is an obvious contraindication.

7 Answer A. Sepsis is the most common risk factor or condition leading to the development of ARDS. ARDS is defined as the development of acute respiratory failure, with noncardiogenic pulmonary edema (established by the presence of bilateral infiltrates consistent with pulmonary edema on chest radiography and a pulmonary capillary wedge pressure ≤ 18 mm Hg indicating that the edema is noncardiogenic), and severe hypoxia such that the

$P_{aO_2}:F_{iO_2}$ ratio ≤ 200 . Identical findings in patients with a $P_{aO_2}:F_{iO_2}$ ratio ≤ 300 are diagnosed with acute lung injury (ALI), instead of ARDS, but the etiology of ALI is the same. Although sepsis is the most common cause of ARDS, severe trauma complicated by shock, multiple blood transfusions, and aspiration are all independent risk factors. Pancreatitis and near drowning may result in ARDS but are less common causes. Such causes also illustrate the idea that the ARDS may be due to direct lung injury (e.g., severe pneumonia with sepsis) or indirect lung injury (e.g., severe pancreatitis). The latter is presumably due to the widespread release of cytokines and other proinflammatory mediators.

8 Answer B. The patient has temporal arteritis. Steroids are the mainstay of management and should be initiated even before temporal artery biopsy is done. Once significant visual loss has occurred, only one out of three patients who receive IV steroids will improve in the affected eye. However, steroids will nearly eliminate contralateral eye involvement. Patients have a significantly higher risk of thoracic aorta aneurysms, and a slightly higher risk of abdominal aorta aneurysms. Women are five times more likely to be affected than men. Patients younger than 50 years are rarely affected.

9 Answer C. This patient has an exacerbation of congestive heart failure (CHF). Although she has no prior diagnosis of CHF, her clinical history is consistent with the diagnosis. Pleural effusions are common in CHF and thoracentesis generally has no role in their management because they typically resolve with diuretics. This patient also lacks infectious symptoms, which would suggest the presence of pneumonia or a parapneumonic effusion. In patients with severe respiratory compromise as a result of large pleural effusions in the setting of CHF, a secure airway through rapid sequence intubation would be the first step. Although this patient is hypoxic, she has not yet been given supplemental oxygen, so it is premature to intubate this patient at this point. Furthermore, noninvasive ventilation might be attempted before establishing a secure airway in patients with only mild to moderate respiratory distress. B-type natriuretic (BNP) levels may be helpful in determining the etiology of respiratory distress in patients who have mixed cardiopulmonary disease without a clear clinical picture. This patient's clinical picture clearly points toward a diagnosis of CHF, so a BNP level would not provide any additional information.

10 Answer D. The American Cancer Society estimated that approximately 17,000 people were

diagnosed with primary brain tumors in 1999 versus >100,000 people who died with metastatic brain tumors. The most common cause is lung cancer followed by breast carcinoma and colon carcinoma. Malignant melanoma and renal carcinomas metastasize to the brain less commonly. The malignant gliomas, anaplastic astrocytoma, and glioblastoma multiforme are the most common glial tumors, and are typically located in the cerebral hemispheres.

11 Answer C. Owing to denervation in the transplanted heart and the consequent lack of vagal tone, the resting heart rate averages between 100 and 110 beats per minute. However, the heart rate can increase up to 70% of the maximum for age due to circulating endogenous catecholamines and upregulation of β -adrenergic receptors. Although rare, tamponade can occur in the transplanted heart because of scar tissue formation and its ability to contain pericardial fluid or blood under pressure. Before the advent of cyclosporine, acute rejection presented as acute-onset CHF or atrial dysrhythmias with a new S3 and diffusely decreased QRS voltage on EKG. These features are now only present in cases of severe failure, and typical acute rejection, which occurs in 75% to 85% of patients, is diagnosed by endomyocardial biopsy. There is an increased risk of endocarditis with invasive procedures, so antibiotic prophylaxis should be used in any procedure expected to produce bacteremia.

12 Answer B. Femoral neck fractures and intertrochanteric fractures account for 90% of all hip fractures. They both most commonly occur in osteoporotic elderly patients after a low-energy fall. In contrast, young patients develop these fractures in the setting of high-energy trauma such as in high-speed motor vehicle accidents. Therefore, many of those patients have evidence of multisystem trauma. The intertrochanteric femur has a better blood supply than the femoral neck, resulting in a much smaller incidence of avascular necrosis (AVN). As many as 40% of patients with femoral neck fractures may develop AVN. The use of a femoral nerve block in the setting of a femur fracture is an attractive means of delivering adequate pain control to patients. Although it has not been widely used in the United States, several recent papers demonstrate that it is an effective, safe means of pain control in both pediatric and adult patients. Isolated fractures of the lesser trochanter almost always occur in young adults. The fracture represents an apophyseal avulsion due to a forceful contraction of the iliopsoas muscle. A similar injury can occur at the greater trochanter. Patients with isolated lesser trochanter

fractures are normally able to ambulate, although they will complain of pain. Physical examination will demonstrate a patient's inability to lift the affected leg from the floor while in a seated position (iliopsoas insufficiency). Patients will also have pain when they are asked to flex their hip against resistance. PE is most common in the postoperative patient. Acute respiratory distress is most likely because of fat embolism, which complicates 2% to 23% of patients with isolated femoral shaft fractures. Acute respiratory distress, associated with altered mental status, tachycardia, and fever are hallmarks of the illness. Although diffusely scattered petechiae are nearly pathognomonic for the syndrome, they do not normally occur until late in the course of the illness and only occur in 50% of patients.

13 Answer A. Malignant neoplasms account for more than half of all cases of large bowel obstruction. Volvulus and diverticulitis (either through stricture, abscess, or phlegmon formation) are the second and third most common causes.

14 Answer A. Dysuria in all patients is most commonly due to bacterial UTI. Gram-negative enteric rods are the number one causative group, with *E. coli* as the single most likely etiologic agent. Urethritis due to *Chlamydia* and *gonococcus* is also extremely common, as are candidal vaginitis and bacterial vaginosis. Viral and parasitic infections are uncommon causes of dysuria. Allergic urethritis may be responsible in patients who have long-term foreign bodies (such as Foley catheters) in place.

15 Answer C. The anterior cruciate ligament (ACL) is the most commonly injured ligament in the knee which requires surgery. Diagnosis is often made on history, with acute knee swelling and audible "pop" after twisting or lateral force to the knee. Lachman test is the most sensitive acute physical examination test to evaluate for an ACL tear in the acute setting. It involves placing the knee in 20 to 30 degrees flexion and pulling anteriorly on the leg while holding the distal thigh stable and observing for laxity relative to the contralateral knee. The anterior drawer test is another test for the ACL which is not nearly as sensitive as the Lachman, especially acutely. It is important for the emergency physician (EP) to remember that the Lachman is not 100% sensitive in the acute setting due to limited range of motion from joint effusion. The posterior drawer test is used to assess the posterior cruciate ligament (PCL), which is rarely injured. The McMurray test assesses the medial meniscus. The Thompson test checks for integrity of the Achilles tendon.

- 16 Answer B. *C. trachomatis* is the most common bacterial cause of sexually transmitted disease in the United States. Most women infected with *C. trachomatis* are asymptomatic (as many as 85%), although up to one third of women will have signs of infection upon physical examination. *C. trachomatis* takes up residence in the endocervix and causes an intense inflammatory reaction resulting in mucopurulent cervicitis. Treatment consists of a single 1 g dose of azithromycin or 7 days of 100 mg of doxycycline given twice daily. In the setting of more severe infection (pelvic inflammatory disease), doxycycline should be given for 14 days and combined with empiric treatment for *N. gonorrhoeae* and probably *Trichomonas* as well.
- 17 Answer C. Cyclosporine exhibits all the listed toxicities, and may also cause tremor, hyperkalemia, hirsutism, and gingival hyperplasia. However, the most common toxicity associated with its use is dose-dependent nephrotoxicity, which occurs in one third of patients.
- 18 Answer D. Neonates with any vital sign abnormalities, including fever or hypoxia, should be suspected of having a serious bacterial infection until proved otherwise. Even patients who exhibit strong signs of congenital heart disease should receive antibiotics and an evaluation for septic cause of the clinical findings. Cefotaxime and ampicillin are indicated for treatment of the most common pathogens in the neonatal period, Group B streptococci, gram-negative bacilli, pneumococcus, and *Listeria*. Until the exact congenital heart defect can be determined, no therapy that affects ductus arteriosus patency, such as indomethacin, should be administered. Albuterol is indicated for reactive airways disease, and ribavirin is used in select patients with respiratory syncytial virus (RSV) bronchiolitis. Propanolol may be used in certain patients with tetralogy of Fallot during Tet spells to reduce right ventricular outflow obstruction.
- 19 Answer A. Appendicitis is the most common surgical emergency during pregnancy, whereas acute cholecystitis is the second most common surgical problem. Overall, the incidence of appendicitis during pregnancy is widely quoted as equal to the nonpregnant population, with an incidence of approximately 1 to 2 of every 1,000 gestations. However, recent data suggest that appendicitis may actually be slightly less common in pregnancy, particularly during the third trimester. Regardless, the diagnosis of acute appendicitis is more difficult during pregnancy, due to displacement of the appendix from its normal anatomical position. The position of the appendix throughout pregnancy was classically described by Baer in a 1932 paper in which he noted that the appendix moves in a counterclockwise position out of the pelvis and toward the right flank. Recent authors have disputed this, noting that right lower quadrant pain is the most common symptom of acute appendicitis regardless of gestational age. Because a progressive leukocytosis is normal throughout pregnancy, the peripheral white blood cell count may not be useful in the diagnosis of appendicitis during pregnancy, particularly during the second and third trimesters. Ultrasonography should be the first diagnostic imaging test of choice, and it has sensitivity >85%. Appendiceal rupture is most common during the third trimester, occurring twice as often as in the first trimester. This is probably due to the increased difficulty and of making a diagnosis and the concomitant delay in treatment.
- 20 Answer A. The patient has necrotizing (malignant) otitis externa. This condition is seen almost exclusively in the elderly, the immunocompromised, and diabetic patients. It is far more serious than simple otitis externa due to the risk of spread of infection to the mastoid bone, the dural sinuses, and the meninges. Early, mild cases may be treated with outpatient fluoroquinolones active against *Pseudomonas*, but most cases will require admission and possible surgical debridement. *Pseudomonas* and *Staphylococcus aureus* are the most common bacterial pathogens implicated. The facial nerve is the most commonly affected cranial nerve in otitis externa. CT scan, rather than x-rays, is indicated for evaluation of spread of disease. Antivirals have no role in management.
- 21 Answer A. Shoulder dystocia occurs when further progression of fetal delivery is halted by impaction of the fetal shoulders within the maternal pelvis. Although it is more common in diabetic mothers with infants weighing >4,000 g, more than half the cases involve infants <4,000 g and without other risk factors. Rapid recognition and treatment is critical because of an increased risk of fetal hypoxia and irreversible neurologic damage. Other injuries that complicate shoulder dystocia include brachial plexus injuries and humerus and clavicular fractures. The first step in ED management should be a liberal median episiotomy to create more space to allow the posterior shoulder to pass. The next step is the McRobert maneuver, involving hyperflexion of the maternal hips (placing the maternal knees up to the chest), which moves the symphysis pubis over the fetal anterior shoulder. If this fails to work, the next step is moderate suprapubic pressure to push the fetal anterior shoulder below the symphysis. If this fails, the Rubin maneuver should be used. This

involves pushing the most accessible fetal shoulder toward the fetal chest, decreasing the bisacromial diameter and allowing delivery. The next step is Wood corkscrew maneuver, in which the fetus is rotated 180 degrees (preferably clockwise) in an attempt to free the shoulders. If all of these efforts fail, the posterior arm can be grasped, placed on the fetal chest, and swept over the face and out of the vagina. This maneuver may result in fractures or brachial plexus injury.

- 22** Answer A. Roseola infantum, also known as *exanthem subitum* (*sudden rash*), or sixth disease, is caused by human herpesvirus 6. Patients develop a sudden-onset high fever from 103°F to 106°F with hardly any associated symptoms. Owing to the rapid rise in temperature and high fever, however, febrile seizures may occur. The fever lasts for 3 to 4 days and then abruptly subsides, at which point the rash begins. The term *exanthem subitum* or *sudden rash* refers to the startling development of a rash just when the patient appears to be recovering. The rash, as with the illness in general, is benign and self-limited. No treatment is necessary. Rubeola (measles) is characterized by the finding of Koplik spots on the buccal mucosa. The hallmark of rubella is generalized lymphadenopathy. Erythema infectiosum is distinguished by its "slapped cheek" appearance. Scarlet fever is caused by group A *streptococci* and is characterized by its sandpaper rash.
- 23** Answer D. The vesicular lesions on the soft palate are most characteristic of herpangina, which is usually caused by coxsackie viruses A and B. The clinical syndrome usually starts with fever, myalgias, dysphagia, and sometimes headache and stiff neck. Oral lesions of herpangina usually spare the gingiva and hard palate, unlike herpes simplex virus gingivostomatitis. Management of herpangina is completely supportive and ulcers will recede in 10 days. Attention to appropriate hydration is integral, as many patients will be unable to even drink liquids because of pain for the first few days of illness. Aphthous ulcers are classically present on the tongue, buccal mucosa, and soft palate, but they are rarely associated with systemic symptoms of infection. Group A *streptococci* may cause pharyngeal and tonsillar ulcers but not usually more proximal ulcers. Diphtheria classically causes a grayish tonsillar pseudomembrane without ulcerations. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:156.)
- 24** Answer C. The capitate articulates directly with the lunate and dorsally dislocates when there is enough carpal instability due to fracture or

ligamentous injury. On lateral radiographs, the lunate is in proper position relative to the radius, but the capitate falls posterior to the lunate and may even articulate with the distal radius. In lunate dislocation, the lunate dislocates volarly relative to the radius and the capitate is in line with radius. The median nerve is the most common peripheral nerve injured in cases of lunate or perilunate dislocation.

- 25** Answer C. Acutely thrombosed hemorrhoids should be excised within the first 48 hours. Although excision provides rapid relief from pain, the natural history of thrombosed hemorrhoids is spontaneous resolution after several days. Therefore, patients with only mild pain from thrombosis and patients who have already dealt with symptoms for several days should be managed conservatively. Excision in these patients will not provide any added relief.
- 26** Answer C. All of the vessels mentioned provide blood flow to the nose. Kiesselbach plexus is the most anterior and the most easily traumatized. Anterior nosebleeds are usually easily stopped by cautery with silver nitrate or packing with Merocel gauze. Nosebleeds that persist despite adequate packing are posterior in origin until proved otherwise.
- 27** Answer C. Although retinal hemorrhage is a well-known marker for child abuse (shaken baby syndrome), it is present in almost half of all neonates, due to normal birth trauma. Resolution tends to occur in 1 month.
- 28** Answer A. By far, chromosomal abnormalities are the most common cause of first trimester spontaneous miscarriage. At least 50% of first trimester pregnancy losses are related to fetal chromosomal abnormalities. Autosomal trisomy is the most common abnormality, with trisomy 16 being the most common specific chromosomal defect. Polyploidy is the next most common defect, with tetraploidy being most common. Uterine structural abnormalities, cigarette smoking, and trauma may all contribute to fetal loss. However, minor trauma such as a fall or strike to the abdomen, is very unlikely to cause fetal loss. Other factors include corpus luteum failure, antiphospholipid antibody syndrome, and maternal endocrine diseases such as diabetes mellitus and hypothyroidism.
- 29** Answer C. The EKG changes over time in patients with pericarditis. Acutely, concave ST elevation and PR depression with tall T waves are seen. Depression of the PR segment is the most specific EKG finding for acute pericarditis. Concave ST elevation is also common, but can be seen in a

variety of other conditions, including benign early repolarization and left ventricular hypertrophy. An ST-segment to T-wave ratio of >0.25 argues in favor of acute pericarditis. Convex ST elevations are more likely to be due to myocardial infarction than pericarditis. Hyperacute T waves are seen more often in hyperkalemia and infarction than in pericarditis. AV blocks are rarely seen in acute pericarditis. Chronic EKG changes associated with pericarditis include return of ST segments to baseline, T-wave flattening, T-wave inversion, and then complete normalization after a few weeks to months.

- 30 Answer D. Any patient with acute agitation and the potential for violence either to self or others must be physically and chemically restrained. Rapid tranquilization is ideally accomplished with a combination of haloperidol and benzodiazepine. Benzotropine is given to reduce the incidence of acute dystonic reactions that may accompany administration of the antipsychotic medication. Observing the patient in an agitated state struggling against restraints is contraindicated, as the patient may cause harm to himself while fighting. Trying to perform a CT scan with the patient in an acutely agitated, violent state will be impossible and just put the patient and staff at risk for injury. Rapid sequence intubation is not indicated unless rapid tranquilization is unsuccessful and serious morbidity is suspected in the patient, necessitating emergent workup for acute medical or traumatic cause for the psychosis.
- 31 Answer C. The CT scan shows diffuse, bilateral bright signal consistent with acute hemorrhage in the subarachnoid space. Epidural and subdural hematomas are usually focal, unilateral, and often cause midline shift. Cerebral contusion appears as blood in the parenchyma rather than the cisterns. Diffuse axonal injury (DAI) usually does not appear on an emergent brain CT and requires clinical evaluation and MRI for diagnosis. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:45.)
- 32 Answer A. Elder abuse is an underreported problem that is slowly increasing in incidence with better layperson and health provider education and recognition. Although much data is still lacking, it is clear that elders who undergo abuse are at higher risk for morbidity and mortality than nonabused elders. Women, the extreme elderly, and patients with severe physical and cognitive dysfunction are all at higher risk. The most common type of elder abuse is neglect; sexual abuse occurs but is uncommon. Physicians

comprise only a small minority of reporters of elder abuse for a variety of reasons, including lack of awareness or education about the problem. Most perpetrators are family members or direct caregivers. Every ED should have specific protocols for screening for and reporting elder abuse, along with an action plan for confirmed abuse.

- 33 Answer C. As with other deep space infections of the neck, CT is the most valuable diagnostic tool. Although lateral neck x-rays are the preferred initial imaging modality for suspected retropharyngeal space infections, they do not typically provide useful information in patients with suspected parapharyngeal infections. Furthermore, CT is better able to localize the specific site of infection in patients with retropharyngeal abscesses. Anterior-posterior plain films of the neck are occasionally used to support a diagnosis of croup (steeple sign), but have no role in the diagnosis of parapharyngeal space infections. Both MRI and ultrasonography are capable of providing useful information, but MRI is limited by time and access constraints and ultrasonography provides much less detail and is less able to accurately localize the site of the problem.
- 34 Answer E. The image reflects an avulsion fracture of the base of the fifth metatarsal. Confusion regarding the differences between a Jones fracture and a simple avulsion of the base of the fifth metatarsal (sometimes referred to as a *pseudo-Jones fracture*) is partly due to the inconsistency in their respective definitions in the literature. However, the most consistent definition of a Jones fracture is a fracture of the fifth metatarsal that occurs distal to the junction of the metaphysis and diaphysis. Radiographically, this is variably identified as a fracture occurring at least 1.5 cm from the base of the fifth metatarsal to a fracture occurring distal to the distal edge of the neighboring cuboid. Both Jones fractures and avulsion fractures of the metatarsal head are typically due to inversion injuries. In the case of avulsion fractures, the peroneus brevis tendon, which inserts at the base of the fifth metatarsal, avulses a fragment of bone during acute ankle inversion. Patients with avulsion fractures do well with conservative treatment such as a compressive dressing, a hard soled orthopaedic shoe, and weight bearing as tolerated (crutches if needed). In contrast, there is a high incidence of malunion and nonunion in patients with Jones fractures. Such patients are placed in a short leg cast and should be nonweight bearing until orthopaedic follow-up. Most of the patients require surgical fixation with a screw. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's*

text-atlas of emergency medicine. Lippincott Williams & Wilkins; 2004:542.)

- 35** Answer D. Gonococcus can cause either a migratory, polyarticular arthritis or monoarticular arthritis. Synovial fluid Gram stain is positive more often than culture. It is the most common cause of septic arthritis in the young, sexually active adult, and is much more common in women than men. The most common joints affected are the knees, wrists, and ankles. A clinical syndrome of arthritis, tenosynovitis, and dermatitis (discrete hemorrhagic pustules) may occur. Although urethral and cervical cultures are high-yield, patients rarely complain of associated symptoms. Treatment involves intravenous antibiotics (third generation cephalosporin) and inpatient observation. Although orthopaedic consultation is warranted, open drainage is rarely necessary.
- 36** Answer D. Decompression sickness (DCS) is due to the presence of nitrogen bubbles in the blood and tissues. It is divided into type I DCS and type II DCS. Type I DCS affects the musculoskeletal system, skin, and lymphatic vessels. Type II DCS involves all other organ systems. The shoulder and elbow are the most common joints involved in type I DCS. The arthralgias experienced by patients with type I DCS are known as *the bends*. Joint pain may be reduced by inflating a blood pressure cuff over the affected joint to 150 to 200 mm Hg. This may also be used to aid in diagnosis although it has a poor sensitivity.
- 37** Answer D. MRI is the most sensitive test to detect ocular foreign body, but should never be used when a metallic ocular foreign body is suspected. Plain radiographs are useful but are not as sensitive as CT scan. Ultrasonography is highly operator dependent. Nuclear medicine scans have no role in ocular foreign body detection.
- 38** Answer C. Kidney stones most commonly occur in middle-aged patients, usually men. Risk factors include age, male gender, family history, and conditions which increase serum and urinary calcium levels. Kidney stones are divided into four main categories—calcium, magnesium ammonium phosphate, uric acid, and cystine. Calcium stones represent approximately two third of all stones and occur more often in patients with common precipitants of hypercalcemia, including hyperparathyroidism, milk-alkali syndrome, laxative abuse, and sarcoidosis. Inflammatory bowel disease also leads to the formation of calcium oxalate stones, due to hyperoxaluria. Magnesium ammonium phosphate (struvite) stones account for one fifth of all calculi and occur in patients with UTIs due to *Proteus*, *Klebsiella*, and *Pseudomonas*. Uric acid stones occur in patients with hyperuricemia, often due to gout. They are usually radiolucent and missed on plain radiographs. Cystine stones are the least common and are due to hypercystinuria, an inborn error of metabolism usually diagnosed at birth.
- 39** Answer D. Paroxysmal supraventricular tachycardia (PSVT) is the most common cardiac rhythm disturbance in pediatric patients. Children are more likely than adults to have an accessory pathway as a cause, but reentrant AV nodal rhythms are common in older children. Treatment involves vagal maneuvers, adenosine, and AV nodal active agents in a stepwise manner. As in adults, unstable tachydysrhythmias necessitate electrical cardioversion. Atrial fibrillation and flutter are rare in pediatric patients without structural heart disease. Complete heart block is uncommon in children. Ventricular tachycardia is less common than PSVT in children.
- 40** Answer B. Reduction of anterior shoulder dislocations may be accomplished through a variety of methods, none of which is clearly superior to the others. A high rate of complications is associated with use of the Kocher method (leverage, adduction, and internal rotation) and the Hippocratic method (axillary traction with the physician's foot). The most important factor in determining success of relocation is adequate muscle relaxation, which may be ensured by either procedural sedation or intra-articular anesthesia. Scapular manipulation is performed with the patient in prone position and should not be used in patients who are pregnant in the third trimester due to compression of the uterus.
- 41** Answer B. The anion gap (AG) is used to signify the difference between the concentration of sodium ($[Na^+]$), and the sum of the concentrations of chloride ($[Cl^-]$) and bicarbonate ($[HCO_3^-]$) such that: $AG = [Na^+] - [Cl^-] - [HCO_3^-]$. However, because of the law of electroneutrality, all aqueous solutions must have an equal number of positive and negative charges such that the entire solution is neutral. Therefore, the AG does not reflect a true "positive" or "negative" charge in the plasma. Instead, it reflects the presence of an anion which the formula is not measuring. In normal patients, albumin accounts for the bulk of these "unmeasured anions." Each 1 g per dL decrease in the concentration of albumin will decrease the expected AG by approximately 2.5 to 3 (the normal albumin concentration is roughly 4 g per dL \times $\sim 3 \approx$ expected AG of 12). Therefore, patients with hypoalbuminemia (e.g., cirrhosis, malnutrition) will have a smaller, normal AG.

Sulfate, phosphate, and citrate make up the bulk of the remaining unmeasured anions.

42 Answer B. The classic CSF finding in patients with Guillain-Barré syndrome (GBS) is termed *cytoalbumin dissociation*, which refers to the fact that protein levels are elevated without a concomitant rise in white blood cell counts. Despite this, lumbar puncture and CSF examination is not necessary to make a diagnosis of GBS, although they are usually performed. The only two *requirements* for the diagnosis are progressive motor weakness of more than one limb and areflexia, which is typically global. Lumbar puncture is not contraindicated in the setting of GBS. In contrast, it is commonly performed to support the diagnosis and to rule out other causes. Oligoclonal bands are most commonly associated with multiple sclerosis, although they may be present in other diseases as well. They are not found in GBS.

43 Answer E. There is no relationship between seafood or shellfish allergies and adverse reactions to iodinated RCMs. Adverse reactions to RCMs are related to their osmolarity and are anaphylactoid in nature (i.e., not dependent on IgE sensitization). They are not related to the presence of iodine in the contrast material. Each of the other patients has a condition that places them at risk for an adverse event, although there are no absolute contraindications to the use of RCM. A history of atopy (e.g., almost all patients with asthma, allergic rhinitis, or atopic dermatitis), preexisting coronary artery disease, the use of β -blockers or a prior adverse event with RCM administration each places a patient at risk for a future event. Various protocols for pretreatment exist and vary by institution, although they almost invariably involve the use of corticosteroids and antihistamines over a 12-hour period before the study.

44 Answer D. Sickle cell disease is a hemoglobinopathy causing sickling of red blood cells with any systemic stress, which results in diffuse microinfarctions. Sickle cell trait is present in approximately 10% of all African Americans, and sickle cell disease is primarily a disease of this population. Symptoms involve multiple organ systems and result in specific acute crises—vaso-occlusive, acute chest syndrome, splenic sequestration, and aplastic. Aplastic crises are characterized by the acute onset of worsening anemia combined with bone marrow failure. Laboratory abnormalities demonstrate a drop of hemoglobin of 2 g per dL from stable levels and an inadequate reticulocyte response (<2%) from the bone marrow to this sudden anemia. Aplastic crises are usually

postinfectious and are responsible for 5% of all death in sickle cell patients.

45 Answer B. Although rectal involvement is uncommon in patients with Crohn disease and nearly universal in patients with ulcerative colitis, perianal complications are much more common in patients with Crohn disease. The anal canal is the most terminal segment of the large intestine. In approximately 25% of patients with Crohn disease, perianal complications may occur before the onset of overt disease. Toxic megacolon is more common in patients with ulcerative colitis. Erythema nodosum occurs most often in women patients with Crohn disease. Anal fissures associated with Crohn disease are typically eccentrically located. In patients without Crohn disease, more than 90% of fissures are located in the posterior midline.

46 Answer C. One of the guiding principles of peripheral nerve testing is to evaluate nerves in their "autonomous zone" of innervation (i.e., where there is no overlap of adjacent nerves or nerve roots). In the hand, the standard autonomous zone for testing the median nerve is the volar aspect of the index finger, distal to the distal interphalangeal (DIP) joint (the tip of the index finger); the zone for testing the ulnar nerve is the volar aspect of the little finger, distal to the DIP joint (the tip of the little finger). The radial nerve, however, has a far less well-defined autonomous zone as there is much overlap with cutaneous branches of other nerves. The best area for testing is the dorsal aspect of the webspace between the thumb and the index finger. This area overlies the first dorsal interosseus muscle, which is an ulnar innervated structure. However, cutaneous innervation to this area is primarily served by the radial nerve. The C5 nerve root does not have contributions to the hand and the C6 nerve root contributes to the median and radial nerves but not the ulnar nerve which receives contributions primarily from C8 and T1 and occasionally C7.

47 Answer E. The relative risk for smokers developing pancreatic cancer is at least 1.5, but this number rises further with the amount of cigarette consumption. The second most important factor is a high-fat (or meat-based) diet. Diets rich in fruits and vegetables have been found to be protective. Chronic alcohol use also probably increases the risk, although this has not been firmly established.

48 Answer B. Preeclampsia is associated with vaso-spasm, reduced renal blood flow and glomerular filtration rate and increased total body water resulting in edema. However, hypovolemia results

in decreased uteroplacental blood flow and possible fetal injury. Diuretics and hyperosmotic agents should therefore never be used in the setting of preeclampsia. Although volume expanders such as albumin may sound like a good idea, they do not reverse vasospasm or improve uteroplacental blood flow. Instead, maintenance fluids should be given although recommendations between authors vary. Owing to the risk of pulmonary edema and the inability of intravenous fluids to reverse vasospasm, however, aggressive large fluid boluses should also be avoided. One author recommends 5% dextrose in lactated Ringers solution with close monitoring of urine output, which is maintained at approximately 30 mL per hour. Excessive urine output may indicate fluid overload, placing patients at risk for pulmonary edema.

99 Answer C. The discriminatory zone is the quantitative serum β -hCG level at which a normal pregnancy can be detected by either transvaginal or transabdominal ultrasonography. As ultrasonographic technology improves, the discriminatory zone continues to drop. Furthermore, these levels may vary somewhat between hospitals due to technologic differences. However, the accepted range is 1,000 to 2,000 mIU per mL for transvaginal ultrasonography and 2,400 to 3,600 mIU per mL for transabdominal ultrasonography. Other sources cite a range of 1,500 to 2,500 mIU per mL as the accepted range in transabdominal ultrasonography. Of course, the higher the discriminatory threshold, the higher the specificity for an abnormal pregnancy, including ectopic gestation.

50 Answer E. CT has become the test of choice for diagnosis of kidney stones, replacing the intravenous pyelogram in this regard. It has excellent sensitivity and specificity and is helpful in evaluating other conditions in the differential diagnosis of flank pain. Twenty percent of kidney stones have normal urinalyses, without microscopic hematuria, so a normal urinalysis in highly suspicious cases by no means rules out the diagnosis of kidney stone. Radiographs have <75% specificity for the diagnosis, and false positives from phleboliths, calcified lymph nodes, and bone shadowing are common. Most kidney stones are radiopaque—uric acid stones, representing approximately 10% of all stones, are radiolucent. Ultrasonography, although possessing good sensitivity and excellent specificity for hydronephrosis, has relatively poor sensitivity for ruling out the diagnosis of kidney stone.

51 Answer E. Middle ear barotrauma or “middle ear squeeze” is the most common barotrauma-related

problem during descent. Ear pain during descent is the most common symptom, although transient hearing loss may occur. Additionally, if the diver continues to deeper water, further increases in pressure may result in tympanic membrane (TM) rupture. TM rupture may alleviate some of the pain but it also exposes the middle ear to cold water, which may result in nystagmus and vertigo. A facial nerve palsy also uncommonly occurs. Nitrogen narcosis occurs during descent as increased levels of nitrogen are “forced” into the tissues. Symptoms typically occur at approximately 100 ft and resemble alcohol intoxication. Barosinusitis presents as facial pain that results from pressure changes in one of the facial sinuses. Facial barotrauma occurs when divers fail to equilibrate the airspace created by a dive mask over the eyes and nose. The relative negative pressure causes petechial hemorrhages on the face, subconjunctival hemorrhage, and conjunctival edema. Temporomandibular joint dysfunction is caused by teeth clenching and malocclusion resulting from a poorly fitting mask. The pain is felt near the ear and can be confused with middle ear barotrauma.

52 Answer E. There are numerous potential complications of *B. pertussis* infection and complications are not uncommon. They can be divided into mechanical complications as a result of severe cough and infectious complications. Mechanical complications include subconjunctival hemorrhage, Mallory-Weiss tears, pneumothorax and pneumomediastinum, atelectasis, urinary incontinence (increases with age), syncope, rib fractures, facial and truncal petechiae, abdominal and inguinal hernias, and back pain. Infectious complications include pneumonia (up to 20% in children, versus only 2% to 4% in adults), sinusitis, and otitis media (most common infectious complication). The most serious complication in young infants is apnea leading to hypoxia, cyanosis, and possibly death. It is because of this complication, that all infants with *B. pertussis* infection should be admitted to an intensive care unit (ICU) setting for appropriate monitoring. This complication most commonly occurs in infants just a few weeks old. Pneumonia may be primarily caused by *B. pertussis* in young infants, whereas the pneumonia that occurs in adolescents and adults is usually caused by a secondary infection. Other rare complications include seizures (0.3% to 0.6%), encephalopathy (0.1%), and even carotid artery dissection.

53 Answer D. *Chlamydia* is the most common cause of nongonococcal urethritis, accounting for over half of all cases. Symptoms are very similar to a UTI—however, urethral discharge worse in the morning is more characteristic of urethritis.

Screening for other sexually transmitted diseases (STDs) should be pursued. Therapy is with doxycycline or azithromycin and sexual partners should also be treated. Choices A, B, and E all cause urethritis, but are less common than *Chlamydia*. Choice C causes chancroid, a syndrome of a painful, ulcerated lesion on the genitalia in association with inguinal lymphadenopathy.

54 Answer D. Posterior nosebleeds are potentially life-threatening causes of hemorrhage due to the difficulty in management. The most common bleeding vessel is the nasopalatine artery, a branch of the sphenopalatine artery. Posterior nosebleeds are assumed to be present if a nosebleed is unable to be controlled with an adequate anterior nasal pack. Posterior packing devices such as the Epistat may be placed to provide both posterior and anterior tamponade. Patients with posterior packs should be admitted to units that provide telemetry and pulse oximetry monitoring (usually the ICU), given antibiotics to cover gram-positive organisms, and ENT consultation should be sought.

55 Answer D. This patient has Henoch-Schönlein purpura (HSP), which is a systemic, small vessel vasculitis that most commonly affects children. The classic presentation is a patient with a palpable, purpuric rash in dependent areas such as the buttocks and lower extremities, abdominal pain, hematuria, and joint pain. Renal involvement is common, but typically manifests as microscopic hematuria and resolves without sequelae. However, more severe presentations from nephritis to nephritic syndrome rarely occur. Long-term prognosis in HSP is determined primarily by the degree of renal involvement. Patients with HSP do not have thrombocytopenia. High-dose aspirin is a therapy reserved for patients with Kawasaki disease. Intussusception is commonly associated with intussusception. However, in contrast to most patients with intussusception in which the obstruction occurs in the ileocolic region, patients with HSP experience ileoileal intussusception. In the great majority of cases, HSP is a benign, self-limited disease that requires only supportive therapy. Steroids remain controversial and are only used for patients with severe symptoms. (Figure reprinted with permission from Fleisher GR. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003:311.)

56 Answer A. There are two accepted and commonly used rapid cooling modalities in heat stroke. One involves pouring or spraying tepid water over a patient and using a fan to enhance evaporative cooling through convection. The second is immersion in an

ice water bath. Some authors favor ice water immersion because it is thought to result in more rapid cooling. However, ice water immersion presents challenges as patient monitoring and resuscitation is more difficult and immersion containers may not be readily available. The application of ice packs to the axilla and groin should be considered an adjunct only as its use is inferior to tepid water and fanning alone. Antipyretics and dantrolene play no role in the management of heat stroke although dantrolene may be considered in refractory cases, thought to be due to malignant hyperthermia. More invasive cooling means, such as gastric, pleural, or bladder irrigation, as well as intravascular cooling is reserved for only the most severe, refractory cases and have not been studied to support their routine use.

57 Answer C. Sigmoid volvulus accounts for 75% of volvulus cases, whereas cecal volvulus accounts for the remaining 25%. Although patients with cecal volvulus are younger than patients with sigmoid volvulus, they are not young, as affected patients are typically in their late fifties. Plain films are diagnostic in 80% of cases of sigmoid volvulus but <50% of cases of cecal volvulus. The classic findings of cecal volvulus include a massively dilated cecum typically in the left upper quadrant or epigastrium (i.e., not within the right abdomen). Although selected patients with sigmoid volvulus may be candidates for endoscopic reduction, patients with cecal volvulus almost always require surgical repair due to the difficulty of accessing this area endoscopically and the need for cecopexy to prevent recurrence.

58 Answer D. Colon ischemia or ischemic colitis is the most common intestinal ischemic malady. The disease can occur at any age but most commonly affects elderly patients with known vascular disease. Patients typically present with acute-onset, mild, crampy abdominal pain associated with an urge to defecate and hematochezia. As many as 50% of cases are initially misdiagnosed as inflammatory bowel disease (typically ulcerative colitis). The disease is due to decreased colonic blood flow, which disproportionately affects the colonic mucosa. It is isolated to the left colon in 75% of cases and most commonly occurs in the splenic flexure, which is the watershed area between the superior and inferior mesenteric arteries. The classic radiographic finding, seen in only 20% of cases, is "thumbprinting," which is the finding of blurred intraluminal protrusions due to submucosal hemorrhage and swelling. However, the diagnosis is now made almost entirely through colonoscopy. Angiography has no role except in rare cases of isolated right colon involvement, which raises the possibility of superior mesenteric artery

thrombosis. Instead, treatment is supportive, with intravenous fluids and bowel rest. Surgery is only required in cases of peritonitis. Most patients with colon ischemia recover with supportive therapy, although strictures may occur as part of the healing process. The mortality rate is much lower than ischemia of the small intestine.

- [59] Answer B. Patients with hepatitis A never develop chronic disease. Approximately 100% of patients recover from acute illness within 6 months, although fulminant hepatitis leading to death rarely occurs. The mortality rate of hepatitis E infection during pregnancy depends on the trimester during which a woman is infected. The maternal mortality rate is only 1.5% for infections in the first trimester, 8.5% for those in the second trimester, and 21% for those in the third trimester. Roughly 5% of children infected with hepatitis A are symptomatic at presentation versus 70% to 80% of adults. In endemic areas, such as Southeast Asia, most of the population is infected as children, and most of the community is immune by age 10. Hepatitis A is the most common cause of viral hepatitis worldwide. Hepatitis A is transmitted through the fecal-oral route. Although percutaneous transmission may occur (e.g., through a needlestick injury), it is very rare because the concentration of the virus in the blood is quite low and the duration of viremia is brief.
- [60] Answer A. Nocturnal symptoms point against a diagnosis of irritable bowel syndrome but are common in patients with Crohn disease. Weight loss also points against irritable bowel syndrome but is a less specific complaint. Bilious vomiting is not common in either disease.
- [61] Answer C. The most common causes of acute otitis media are *S. pneumoniae* and *M. catarrhalis*. *M. pneumoniae* is an uncommon cause of otitis media, especially in this age-group. The incidence of infections due to *H. influenzae* has decreased since the introduction of the Hib vaccine. Viruses as a group account for up to one out of every six cases of otitis media—respiratory syncytial virus (RSV) is the single most common viral cause of otitis media. Group A streptococcus is the least common of the bacterial pathogens listed.
- [62] Answer A. The radial nerve may be injured in as many as 20% of humeral shaft fractures because of its close proximity to the humerus as it travels posteriorly in the spiral groove. Most of these injuries are transient neurapraxias and will improve without intervention. Therefore, such injuries should be well documented and followed by close outpatient

observation. Injuries to the radial nerve in this area result primarily in wrist drop along with weakness of finger extension and hypoesthesia and decreased two-point discrimination in the distribution of the radial nerve. The radial nerve also innervates the supinators of the wrist, resulting in difficulty with supination. Because the radial nerve sends branches to the triceps before its entrance into the spiral groove, elbow extension is unaffected (although it may be weak due to pain resulting from the fracture). (Figure from Reece RM, Ludwig S. *Child abuse: Medical diagnosis and management*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001:150, with permission.)

- [63] Answer E. Unlike the adult, the narrowest portion of the pediatric airway is the cricoid cartilage, necessitating the use of uncuffed tubes in children younger than 8 years. Other important considerations for the pediatric airway are the proportionally larger tongue, floppier epiglottis, more anterior airway position, and shorter tracheal length. These anatomic differences require slightly different techniques from those used with adult airway management, including an adjunctive oral airway, frequent use of a straight blade, and more anteriorly directed laryngoscopic technique. Most children older than 12 years have similar airway characteristics to adults.
- [64] Answer E. Tinea versicolor is a fungal infection of the skin caused by *Pityrosporum ovale* (oval form) and *Pityrosporum obiculare* (round form). These organisms were previously called *Malassezia furfur*. Tinea versicolor is a benign and common fungal infection of the skin that most commonly occurs in areas of the skin with increased sebaceous activity. It is most common in the upper trunk but it commonly spreads to the arms, neck, and abdomen. Lesions may be a variety of colors, but are classically hypopigmented white or tan macules and patches. Griseofulvin is not effective against these fungi, but multiple other agents are effective, including topical ketoconazole, selenium sulfide, and terbinafine as well as oral itraconazole, fluconazole, and ketoconazole. Although such therapy is highly effective, recurrence is common after it is discontinued.
- [65] Answer A. Glucocorticoids are useful in thyroid storm because patients with thyroid storm may develop relative adrenal insufficiency as a result of the increased metabolic demands. In addition, high-dose corticosteroids inhibit release of thyroid hormone from the thyroid gland as well as peripheral conversion of T_4 to T_3 . Apathetic thyrotoxicosis is a rare presentation of hyperthyroidism that primarily occurs in the elderly. Cardiac manifestations, such as atrial fibrillation and CHF, typically predominate. Most

patients with thyroid storm have underlying Graves disease, which is the most common cause of hyperthyroidism. Hashimoto disease is the most common noniatrogenic cause of primary hypothyroidism (although it may cause a transient thyrotoxicosis in its acute phase). Treatment of Graves disease is probably the most common cause of primary hypothyroidism. Sinus tachycardia is the most common dysrhythmia in thyroid storm.

- 65** Answer C. Patients with anterior shoulder dislocation and subsequent relocation are at extremely high risk of recurrent dislocation. Young patients are the highest risk group, probably because of a combination of associated cartilaginous injury and overly aggressive return to previous activity. Surgical stabilization is recommended in these patients to prevent recurrence. The other answer choices are all complications of anterior shoulder dislocation but occur less commonly than recurrent dislocation.
- 67** Answer B. Chicken pox is an acute illness caused by Varicella-Zoster virus (VZV) causing fever, myalgias, and a maculopapular rash progressing to vesicles which then rupture and form dry crusted lesions. Children are the most common group affected, and serious disease can occur in adults. Immunocompetent children are treated symptomatically with acetaminophen for fever. Aspirin should be avoided in children with viral illnesses, as this may predispose to Reye syndrome. Acyclovir is used in adults, immune-compromised patients, and when there are signs of encephalitis or pneumonitis. VZV vaccine is indicated for prevention and has no role in acute management of evident disease. VZV immune globulin is only indicated in immune-compromised patients in conjunction with acyclovir.
- 68** Answer D. "Hamman crunch" refers to the crunching sound heard during cardiac auscultation in the setting of pneumomediastinum. Radiographic abnormalities are present in up to 90% of patients with esophageal perforation, and include pneumomediastinum, subcutaneous emphysema, pleural effusion and pulmonary infiltrate. Pleural effusions may occur and are usually right sided if the perforation occurs in the midesophagus, but left sided if the perforation occurs in the distal esophagus. Pneumoperitoneum may also occur if the patient has a rupture of the intra-abdominal esophagus. (Figure from Swischuk L. *Emergency radiology of the acutely ill or injured child*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 1986:63,77,79, with permission.)
- 69** Answer C. The patient has a medial malleolar fracture with associated proximal fibular fracture—this

injury is known as Maisonneuve fracture. The force of the initial ankle injury disrupts the syndesmosis between the tibia and fibula and exits from the proximal fibula. Maisonneuve fracture puts the ankle mortise joint at extreme risk for instability and stress views of the ankle should be performed to evaluate for this. Any significant instability seen may require operative management. MRI of the knee may evaluate for any associated ligamentous injury of the knee but is unnecessary in the acute setting. Ankle MRI can diagnose an associated deltoid ligament tear, but it is easier, cheaper, and faster to perform stress radiographs acutely to assess for mortise instability. Discharging the patient without proper immobilization of the ankle and evaluation of Maisonneuve fracture is contraindicated.

- 70** Answer E. Cerebral venous thrombosis (CVT) is a rare cause of stroke and is extremely variable in its presentation. The most common presenting symptom is headache. In contrast to arterial stroke, patients with CVT present acutely only 30% of the time, subacutely (more than 2 days after symptom onset) in 50% of cases, and chronically (more than 1 month after symptom onset) in 20% of cases. The area of the sinus involved determines the symptoms. The most common sinuses to be affected are superior sagittal sinus, the cavernous sinus, and the transverse (or lateral) sinus. Thrombosis of other sinuses is less common but may be underdiagnosed because of the difficulty in recognizing the manifestations of thrombosis. MRI and magnetic resonance venography is the gold standard for diagnosis. Although changes consistent with CVT may be visible on CT, its sensitivity is inadequate to exclude the disorder, as it may be normal in up to 30% of cases. Heparin is the mainstay of therapy, even in patients with evidence of hemorrhage, although some patients may be candidates for catheter-directed thrombolysis. In general, CVT has a better outcome than arterial stroke, although patients with deep cerebral and cerebellar venous thrombosis have poor outcomes. Women with CVT outnumber men by a ratio of 3:1, in part due to the use of oral contraceptives and because of the increased risk of venous thrombosis surrounding pregnancy and the immediate postpartum period. Although either focal or generalized seizures may occur, most seizures are focal due to the focal irritation of the cortex affected by the thrombosis.
- 71** Answer D. Testicular torsion is the most likely diagnosis because of the acute testicular pain, nausea, and absence of ipsilateral cremasteric reflex. Pathophysiology involves twisting of the testis on the spermatic cord due to an anatomic abnormality or

trauma. In unclear cases, color Doppler ultrasonography is the diagnostic test of choice, but in textbook cases such as this, emergent urologic consultation is indicated. Prompt diagnosis is essential, as testicular survival is directly dependent on duration of symptoms—if surgical management is instituted within 6 hours of pain, approximately 100% of cases are salvageable. Definitive surgical management involves bilateral orchidopexy. Antibiotics are used to treat epididymitis, a common condition in the differential diagnosis of the acute scrotum. Analgesics and antiemetics should be considered conjunctive therapy in patients with testicular torsion but do not affect the disease process itself. Manual detorsion may be used as a temporizing measure, but should never be considered definitive therapy. Lithotripsy is used to treat kidney stones, and has no role in the management of testicular torsion.

72 Answer A. *H. capsulatum* is the most common pulmonary fungal infection worldwide. It may infect immunocompetent as well as immunocompromised individuals, but primary infection is almost always asymptomatic and very few cases are ever brought to the attention of a physician. In endemic regions, at least 80% to 90% of the population has positive skin testing by the age of 20. *Histoplasma* and *Blastomyces* are endemic to the Mississippi and Ohio River valleys in the United States, whereas *Coccidioides* is found in the arid southwest. In contrast, *Cryptococcus* is ubiquitous throughout the world, without a specific distribution. It generally causes disease in immunocompromised hosts, and is the most common cause of life-threatening fungal infection in patients with human immunodeficiency virus (HIV). Except in a few rare cases, patients with fungal pulmonary infection are not capable of transmitting disease to others. Of the fungi that cause systemic mycoses, *Blastomyces* most commonly causes disseminated disease.

73 Answer A. The patient has evidence of whooping cough caused by *B. pertussis*, a gram-negative coccobacillus (like *H. influenzae*). The disease occurs in three phases—the catarrhal phase, a nonspecific URI-like syndrome lasting 1 to 2 weeks; the paroxysmal phase lasting up to 1 month, with paroxysms of coughing fits; and the convalescent phase lasting up to several months, with a chronic, intermittent cough. Antibiotic therapy with macrolides is usually only effective in the catarrhal phase, but should be given to patients to reduce the high degree of contagiousness. Corticosteroids and β -agonist nebulizers may be useful as adjunctive therapy. Cultures are useful only in the catarrhal phase, and have low sensitivity during the paroxysmal phase. Mortality is low

and usually due to superinfection, most commonly from pneumonia.

74 Answer D. Adult patients infected with hepatitis B develop chronic hepatitis B <5% of the time. In contrast, patients with acute hepatitis C infection become chronic carriers 80% to 90% of the time. Hepatitis C is most commonly acquired by intravenous drug use (IVDU) or blood transfusions. In the United States, both blood donors and the donated blood are screened for hepatitis C, so the risk of infection through this route is quite low and IVDU predominates. However, worldwide, <40% of the blood supply is tested for hepatitis C. Hepatitis C is the least common viral cause of fulminant hepatic failure. Coinfection with hepatitis B and D is the most common. The white blood cell count has almost no utility in the setting of hepatitis infection.

75 Answer E. The fruit shown is of the plant, *Datura stramonium*, commonly referred to as *Jimson weed* or *thorn apple*. Seeds inside the fruit contain belladonna alkaloids, including atropine and scopolamine, which cause anticholinergic symptoms. Anticholinergic crises are treated supportively, with decontamination, IV hydration, benzodiazepines for agitation or seizures, hyperthermia control, and cardiac monitoring. Physostigmine is an acetylcholinesterase inhibitor that may be used in select anticholinergic poisonings. Physostigmine increases the amount of acetylcholine in the synaptic cleft, allowing it to compete with the anticholinergic agent for the acetylcholine receptor. Physostigmine is contraindicated in patients with tricyclic antidepressant overdoses, as it may precipitate intractable seizures and asystole. Pyridostigmine is a quaternary amine acetylcholinesterase inhibitor which does not cross the blood-brain barrier, rendering it useless as an agent to reverse agitation in anticholinergic toxicity. Edrophonium is a short-acting acetylcholinesterase inhibitor which is used mainly to diagnose myasthenia gravis (MG) by improving muscle strength in patients with MG and worsening muscle strength in cholinergic crisis patients. Pralidoxime is used in organophosphate overdoses, where it breaks up the organophosphate-acetylcholinesterase complex and frees acetylcholinesterase—this action would exacerbate the problem in patients with anticholinergic crises. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:331.)

76 Answer E. Hyperacute bacterial conjunctivitis is usually caused by *Neisseria* species. It is differentiated from ordinary bacterial conjunctivitis by the rapidity

of onset. Populations at risk include neonates and sexually active adults. Prompt diagnosis is essential because of the rapid course and the ability of gonococci to invade intact corneal epithelium. Treatment generally involves systemic and topical antibiotics covering both *Neisseria* and *Chlamydia*, as 30% of patients are coinfectd. Choices A, B, and C are common causes of bacterial conjunctivitis in children. *Klebsiella* is not a common cause of conjunctivitis.

72 Answer A. Hepatitis B infection is the most common viral cause of acute liver failure. However, worldwide, acetaminophen toxicity is the most common overall cause. Idiopathic causes are probably the third most frequent cause of liver failure.

73 Answer B. This patient's symptoms of severe hypertension in concert with a decreased pulse and irregular respirations are consistent with the development of elevated intracranial pressure (ICP). Owing to his history of severe hypertension, he likely suffered an acute intracerebral hemorrhage resulting in an acute increase in ICP and transtentorial (or uncal) herniation. The oculomotor nerve (cranial nerve III) is compressed between the uncus and the tentorium cerebelli resulting in parasympathetic paralysis and subsequent mydriasis ("blown pupil"). Tonsillar herniation results from an increase in posterior fossa pressure (e.g., due to a posterior fossa mass). Symptoms may be subtle or may result in acute cardiorespiratory dysfunction (e.g., when a lumbar puncture is performed in the setting of an undiagnosed posterior fossa mass). Subfalcine herniation occurs in association with a cerebral mass lesion, causing the medial surface of the affected hemisphere to be pushed against the rigid falx cerebri and then herniate underneath it. The cingulate gyrus is most commonly affected and it is often clinically silent.

74 Answer E. Lactated Ringers and 0.9 N NaCl are the most appropriate initial crystalloid fluids to administer in trauma patients. Both are isotonic solutions which effectively replete electrolytes. Lactated Ringers may be preferable to normal saline because it is less acidotic, but no differences in outcomes have been elicited between the two. D10 water, D10 normal saline, and D5 1/2 normal saline are hypertonic solutions containing glucose, which offer no survival advantage and may predispose to hyperglycemia. Half-normal saline alone is hypotonic and would eventually cause electrolyte abnormalities and excessive peripheral edema if given continuously during a trauma resuscitation.

80 Answer D. Spontaneous perforation occurs in only 15% of all esophageal perforations. It is most commonly due to Boerhaave syndrome, which typically occurs in patients with a history of heavy drinking or alcoholism and peptic ulcer disease. Most cases occur after multiple, prolonged episodes of vomiting. Other causes of spontaneous perforation may be due to the aftereffects of caustic ingestion, pill ingestions (e.g., antibiotics, anti-inflammatories, and bisphosphonates), esophageal cancer, aortic aneurysms, and infections (e.g., herpes simplex, *Candida*, TB). However, the most common cause is instrumentation. Procedures that have the potential to cause perforation include upper endoscopy, rigid dilation, pneumatic dilation, sclerotherapy, and even the placement of nasogastric tubes. Symptoms may not be present for several hours after perforation.

81 Answer A. Urethritis in men is commonly caused by *N. gonorrhoeae* and *C. trachomatis*. Symptoms of urethritis are dysuria and penile discharge. Gonococcal urethritis is almost always symptomatic, whereas chlamydial infection can be asymptomatic in one fourth of cases. Both gonococcus and *Chlamydia* coexist in up to half of the cases of urethritis. Diagnosis is made by urine Gram stain and PCR. Gram-negative intracellular diplococci in the urine are diagnostic for gonococcal infection. Chlamydial infection is much more common in men younger than 20. Treatment of urethritis covers both *N. gonorrhoeae* and *Chlamydia*—ceftriaxone IM with a week of oral doxycycline. Sexual partners should be treated as well.

82 Answer C. Although a high-probability V/Q scan can "rule in" a PE in the setting of a patient with an intermediate pretest probability, and a completely normal scan can rule out the disease, any other result will require further testing by CT pulmonary angiography or direct pulmonary angiography. Furthermore, most patients undergoing V/Q scanning will fall into this intermediate group. Therefore, the best test in a patient with an intermediate probability for PE is a CT pulmonary angiogram. D-dimer assays are only useful in the evaluation of patients with very low probability of having a PE. Elevated D-dimer levels cannot confirm a diagnosis of PE, and normal levels can only rule out disease in very low risk individuals. Lower extremity Doppler ultrasonography has been advocated by some as a means to evaluate the presence of venous thrombosis in the setting of inconclusive studies for PE. Regardless of their findings, however, lower extremity ultrasonography cannot prove nor refute the presence of a PE. Arterial blood gas (ABG) has no role in the evaluation of PE.

as PEs may be present regardless of the findings on an ABG.

- 83** Answer C. Cerebral edema refers to an increase in brain water content (rather than an increase in cerebral blood flow) after head trauma. CT can define the extent of cerebral edema, but the appearance on imaging may not correlate with clinical severity. The two types of cerebral edema are vasogenic and cytotoxic. Vasogenic edema is due to dysfunction of the endothelial tight junctions which maintain the blood-brain barrier. It usually occurs in the white matter from a focal injury. Cytotoxic edema results from cerebral ischemia, which causes cellular membrane pump dysfunction and cellular death. Either form of edema may occur with any traumatic injury. Management of cerebral edema is handled on a case-by-case basis and operative treatment is usually based on extent of increased intracranial pressure (ICP) and clinical findings rather than the specific degree of edema observed on CT scan.

- 84** Answer D. Although no trial has definitively evaluated the effect of aspirin when given immediately after a TIA, aspirin has been shown to reduce the long-term risk of stroke and cardiovascular events by 22%. No other agent has been studied as thoroughly as aspirin. The optimal dose of aspirin has yet to be determined, as doses ranging from 75 to 1,300 mg demonstrate similar reductions in vascular events (although the risk of intracerebral bleeding increases at high doses). Regular strength aspirin (325 mg) is probably adequate for most patients. The data regarding the immediate initiation of heparin for patients with TIA and atrial fibrillation is mixed. Finally, patients who are already taking aspirin and who experience a TIA may be candidates for additional drug therapy such as clopidogrel. Consultation with a neurologist is suggested before starting such therapy.

- 85** Answer A. Although sinus tachycardia is the most common *arrhythmia* in patients with PE, **normal** sinus rhythm remains the most common **cardiac** rhythm. A recent study demonstrated that roughly two third of patients with PE have normal sinus rhythm (there was no significant difference from control patients). That does suggest, however, that most patients with PE have normal EKGs, as rhythm is only one aspect of EKG analysis. In fact, most patients with PEs have been found to have abnormal EKGs, but no single abnormality has been shown to have sufficient sensitivity or specificity to aid in the diagnosis. Therefore, the role of EKG in the evaluation of PE is to rule out the presence of alternative diagnoses, such as cardiac ischemia or pericarditis.

- 86** Answer E. Family history in older patients with abdominal or flank pain is an extremely strong risk factor—an affected first-degree relative puts an individual at 20 times higher the risk than the general population. Other risk factors include age older than 50, peripheral vascular disease, hypertension, and patients with other large artery aneurysms.

- 87** Answer C. The cyanotic heart diseases in children can be remembered by the fact that each begins with the letter "T"—truncus arteriosus, transposition of the great vessels, tricuspid atresia, tetralogy of Fallot, and total anomalous pulmonary venous return. Cyanosis generally indicates the presence of right-to-left shunting, causing bypass of the pulmonary circuit and infusion of deoxygenated blood into the systemic circulation. Cyanosis due to cardiac disease is generally central (truncal and facial), unlike dehydration or hypothermia, which usually causes peripheral cyanosis (in the extremities). Evaluation and management of acute episodes of cyanosis from congenital heart disease should be performed in close conjunction with a pediatric cardiologist.

- 88** Answer E. This woman has an oblique fracture of the distal fibula at the level of the mortise as well as rupture of the deltoid ligament. It is clear that the deltoid ligament is disrupted because of the widened medial joint space on the mortise view. Such an injury would be classified as a Danis-Weber class B fracture or a Lauge-Hansen pronation-abduction (eversion) fracture. The need for surgical repair is often based on whether the distal tibiofibular syndesmosis is intact. The squeeze test involves the application of near-circumferential pressure on the tibia and fibula approximately 5 cm proximal to the intermalleolar axis. Pain in the ankle upon squeezing indicates disruption of the syndesmosis, signifies an unstable injury, and is an indication for operative repair in this woman's case. The Maisonneuve fracture is also an eversion injury resulting in a medial malleolar fracture or rupture of the deltoid ligament in concert with an oblique fracture of the proximal fibula. Any patient with a medial malleolar fracture or deltoid ligament rupture (medial joint space widening) as well as lateral displacement of the fibula without a fracture of the distal fibula should be suspected of having a Maisonneuve fracture. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:856.)

- 89** Answer C. As for major depression, SSRIs are the first-line drugs of choice for treatment of most anxiety disorders. They exhibit an excellent safety profile, are effective at managing symptoms, and lack abuse

potential. Benzodiazepines may be used for breakthrough anxiety, but long-term use can result in abuse and withdrawal if stopped suddenly. Monoamine oxidase inhibitors also work well, but dietary restrictions can limit their utility in many patients. β -Blockers are used only in patients with performance anxiety. Tricyclic antidepressants used to be prescribed in the past for treatment of anxiety and depression, but their poor safety profile, especially in overdose, and frequent side effects have relegated them to use as second- or third-line agents. Mood stabilizers are not useful in treating anxiety disorders.

90 Answer A. Owing to cortical atrophy, elderly patients have more intracranial space to accommodate the edema associated with large strokes. Therefore, herniation syndromes are more common in younger patients with less baseline atrophy. Overall, medical treatment of cerebral edema is poor. Patients frequently receive corticosteroids, osmotherapy in the form of mannitol or furosemide, or endotracheal intubation followed by hyperventilation as a means of decreasing elevated ICP due to cerebral edema. None of these methods has been conclusively proved to improve outcome. Corticosteroids, in particular, have only been shown to increase the rate of infections, gastrointestinal bleeding, and hyperglycemia. The effects of hyperventilation last 12 to 36 hours, whereas osmotherapy lasts for 48 to 72 hours. Cerebral edema following ischemic stroke occurs within 24 to 36 hours but typically does not peak for several days.

91 Answer C. Patients with complete knee instability after significant trauma are suspicious for having a knee dislocation. The knee can spontaneously relocate and be mistaken for a severe sprain with large effusion. The popliteal artery is at high risk for damage, and angiography should be performed in every patient with knee dislocation. The presence of pulses in the foot does not rule out popliteal artery injury, as up to 10% of patients with popliteal injury will have intact peripheral pulses. The most common nerve injury in knee dislocation is the peroneal nerve, which may be tested with foot dorsiflexion and dorsal foot sensation.

92 Answer B. In order of decreasing frequency, the small intestine, liver, and colon are the most commonly injured abdominal organs in the setting of penetrating abdominal trauma.

93 Answer A. The *Candida* species, primarily *Candida albicans*, are the most common cause of infectious esophagitis. Affected patients are generally

immunocompromised, either by virtue of HIV infection, or because of diabetes, underlying malignancy, chemotherapy, or treatment with corticosteroids. Patients who were recently treated with broad-spectrum antibiotics are also at risk and there has been some suggestion that the proton pump inhibitor, omeprazole, may increase the risk of *Candida* esophagitis as well. Endoscopy is required to make an accurate diagnosis, as it will reveal the presence of white plaques (*Candida*) or herpetic vesicles. It also affords the endoscopist the opportunity to take biopsy specimens.

94 Answer E. Hydatidiform moles are placental abnormalities characterized by enlarged and edematous placental villi and trophoblastic tissue (into grape-like structures) as well as loss of fetal blood vessels. The two types of hydatidiform moles are complete and incomplete. Complete moles almost always have a 46, XX karyotype that is paternally derived (due to duplication of a paternally derived haploid genome), whereas incomplete moles have a complete trisomy with a karyotype of 69, XXX or 69, XXY. Incomplete moles have two sets of paternal chromosomes (again due to duplication of a paternally derived haploid genome) and one set of maternally derived chromosomes. Complete moles are so named because of complete absence of fetal parts (no fetus, umbilical cord, or amniotic membrane) and swelling of all placental villi. In contrast, incomplete moles have partial placental villi swelling, and may have a few fetal parts present and occasionally a complete fetus. The classic features associated with hydatidiform moles are more common in the setting of complete moles. These include pregnancy-induced hypertension occurring in the first trimester, uterine enlargement greater than expected for dates, hyperemesis and very high β -hCG levels, as well as theca lutein ovarian cysts. Vaginal bleeding is the most common presenting symptom and ultrasonography will reveal the diagnosis in both cases (molar pregnancy in the case of a complete mole, and possibly missed abortion or intrauterine fetal demise in the case of an incomplete mole). The classic ultrasonographic appearance of a complete molar pregnancy is described as a "snowstorm."

95 Answer K. Amebiasis occurs in 10% of the world's population and amebic liver abscess is the most common extraintestinal manifestation of the disease. Patients with amebic liver abscesses more commonly have an acute presentation than patients with pyogenic liver abscesses. Transmission occurs through the fecal-oral route and is usually due to contaminated water or food products. Infections are always caused by *Entamoeba histolytica* and bacterial superinfections are uncommon. Alkaline phosphatase is

elevated in 75% of patients and aminotransferases are increased in 50%. Elevated bilirubin levels are uncommon and reflect biliary obstruction. In contrast to pyogenic liver abscesses, the treatment is non-surgical, and involves metronidazole 750 mg t.i.d. for 7 days. Following metronidazole, some authorities recommend an additional course of a luminal amebicide such as iodoquinol, diloxanide furoate, or paromomycin. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:613.)

96 Answer A. This patient has an auricular hematoma resulting from bleeding in the potential space between the auricular cartilage and the perichondrium to which it is normally adherent. It is important to incise and drain these hematomas because failure to do so may lead to necrosis of the cartilage and subsequent cosmetic deformation of the ear such as "cauliflower ear." This is the same principle that guides treatment of nasal septal hematomas (cartilage necrosis). Though aspiration is a reasonable strategy, recurrence is common and aspiration is sometimes incomplete. Incision and drainage is more definitive and simple to perform. After drainage of the hematoma, the ear is packed in a bulky pressure dressing to prevent reaccumulation of the hematoma. Moist cotton is placed within the folds of ear and then covered with bulky dry cotton. Several pieces of trimmed gauze are placed between the ear and the scalp. The ear is then bandaged circumferentially against the supporting gauze. The patient is discharged with follow-up arranged within 48 hours to assess for reaccumulation. (Figure courtesy of Kathleen Cronan, MD. Reprinted with permission from Chung EK. *Visual diagnosis in pediatrics*. Lippincott Williams & Wilkins; 2006:96.)

97 Answer D. The patient has evidence of fungal balanoposthitis, or infection of the foreskin and glans. Recurrent such infections may be due to an immune-compromised state, most commonly diabetes. Balanoposthitis most often occurs in patients who are uncircumcised and is usually due to infection from typical skin flora. Urinalysis may be indicated to evaluate for sexually transmitted infection. Treatment is with penile hygiene and antibiotics directed at the most likely organisms. Liver function tests would not be helpful in evaluation of penile infection. Postvoid residual volume and intravenous pyelogram evaluate for urinary obstruction. Retrograde urethrogram is used in patients with pelvic trauma and suspected urethral injury.

98 Answer A. The patient is in septic shock, with evidence of vital sign abnormalities, presence of

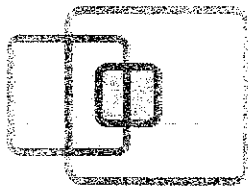
infection, and indication of inadequate tissue perfusion (hypotension). Lack of improvement with aggressive fluid resuscitation predicts a more severe course. Management of septic shock involves invasive monitoring to guide fluid resuscitation, broad-spectrum antibiotics, and vasoactive agent therapy. Intubation with mechanical ventilation is helpful in many cases to reduce the work of breathing by the diaphragm and shunt this perfusion to vital organs. Tube thoracostomy is not indicated if there is no evidence of parapneumonic pleural effusion. Angioplasty is not indicated in cases of septic shock. Surgical consultation is only indicated if there is a surgical cause for the septic shock, such as intra-abdominal abscess or necrotizing fasciitis. Potassium chloride has no role in the management of septic shock in the absence of severe hypokalemia.

99 Answer E. This patient has features of systemic lupus erythematosus (SLE). Black women of child-bearing age are most at risk for developing SLE. This patient is presenting with the classic malar rash after sun exposure in concert with fever and arthralgias. As in rheumatoid arthritis, arthralgias in SLE are typically symmetric and most commonly involve in the fingers, hands, wrists and knees. Fevers are very common in patients with SLE, and nearly all patients will develop a fever at some point in their course, although greater than one third will present with a fever. Patients with SLE have numerous autoantibodies. However, testing for antinuclear antibody (ANA) is most sensitive as 99% of patients with SLE have a positive ANA. The positive predictive value of ANA testing suffers because 5% to 7% of healthy individuals will also test positive for ANA. Anti-Sm is the most specific antibody, with a specificity of 99% and a positive predictive value of 97%. However, its sensitivity is only 25% so it is not a good screening test.

100 Answer A. TB is a chronic, progressive, multi-system illness caused by *Mycobacterium tuberculosis*, an aerobic, acid-fast bacillus. Initial infection occurs through respiratory particles from infected individuals. TB is characterized by primary infection, during which the positive pressure differential (PPD) skin test turns positive, followed by reactivation disease, when the clinical manifestations and pathology become evident. The overall most common symptom of pulmonary TB is cough, followed by weight loss, night sweats, chest pain, dyspnea, and hemoptysis. Patients rarely present to the ED until they develop hemoptysis. Initial evaluation includes a chest x-ray, which has excellent negative predictive value except in HIV patients. Findings

on chest x-ray of primary TB can be indistinguishable from any lobar pulmonary infiltrate combined with hilar lymphadenopathy. Reactivation TB characteristically demonstrates an apical infiltrate which may be cavitary. Sputum samples for acid-fast bacilli analysis should be obtained in the ED before any

antimicrobial therapy is given. If the patient is producing sputum, inpatient gastric aspiration of swallowed sputum or bronchoscopic sampling is indicated. Given the indolent, chronic nature of pulmonary TB infection, antimycobacterial agents need not be started in the ED.



Test 6

Questions

- 1 You are discharging a female patient from the emergency department (ED) with a diagnosis of tension-type headache when she asks you if there is anything she can do to prevent these headaches in the future. Which of the following drugs would you prescribe?
- (A) Valproate
 - (B) Neurontin
 - (C) Propranolol
 - (D) Amitriptyline
 - (E) Verapamil
- 2 An 87-year-old woman is brought to the ED by her caretaker with dehydration and excessive somnolence. Her initial blood work reveals a sodium level of 119 mEq/L and a glucose level of 1,100. Which of the following represents her actual sodium level?
- (A) 109 mEq per L
 - (B) 119 mEq per L
 - (C) 125 mEq per L
 - (D) 130 mEq per L
 - (E) 135 mEq per L
- 3 Which of the following best summarizes the role of chest x-rays in the diagnosis of community-acquired pneumonia (CAP)?
- (A) Validated clinical rules exist to determine which patients with respiratory symptoms require a chest x-ray.
 - (B) The chest x-ray is the most important test in the diagnosis of pneumonia.
 - (C) Chest x-rays are useful to differentiate between "typical" and "atypical" pneumonia.
 - (D) Lobar consolidation is the most common radiographic finding in patients with CAP.
 - (E) Chest x-ray findings help dictate antibiotic therapy.
- 4 A 56-year-old woman presents with acute organophosphate overdose, with severe bronchorrhea, bradycardia, and coma. She is intubated for airway protection, and atropine therapy is initiated. After 10 mg of atropine, her heart rate (HR) is 130, blood pressure (BP) is 160/90, and her secretions are still copious. Which of the following is the most appropriate next step in management?
- (A) Stop atropine, start epinephrine.
 - (B) Stop atropine, start vasopressin.
 - (C) Stop atropine, start pralidoxime.
 - (D) Continue atropine therapy alone.
 - (E) Continue atropine therapy and add pralidoxime.
- 5 A 65-year-old man with a past history of hypertension presents with sudden onset of shortness of breath 8 hours ago. He also reports orthopnea and lower extremity edema, but denies chest pain. He saw his primary care physician who noted a new diastolic murmur. Vital signs are: T 98.4, HR 110, BP 115/76, RR 25, and SpO₂ 90% RA. Examination reveals a patient in moderate respiratory distress, diastolic murmur at the right upper sternal border, bilateral crackles, and lower extremity pitting edema. The electrocardiogram (EKG) shows signs of left ventricular hypertrophy (LVH), troponin I is negative, and chest x-ray demonstrates cardiomegaly and pulmonary edema. Which of the following is the most appropriate definitive therapy?
- (A) Percutaneous transluminal coronary angioplasty
 - (B) Pacemaker placement
 - (C) Surgical valve replacement
 - (D) Dobutamine
 - (E) Tissue plasminogen activator
- 6 Which of the following is true regarding *Bordetella pertussis* infections?
- (A) Prophylaxis with erythromycin is recommended for adults who come into contact with pertussis-infected individuals.
 - (B) Almost all cases of pertussis in adolescents and adults occur in previously unvaccinated patients.
 - (C) Immunization against *B. pertussis* confers lifelong immunity.
 - (D) Older children infected with *B. pertussis* have the most severe disease.
 - (E) The clinical course in symptomatic adults is characterized by a mild cough that resolves within 3 to 7 days.

- 7 Which of the following is useful as a sensitive screening test for clinically significant complications of blunt cardiac injury?

(A) Creatine kinase, MB isozyme (CK-MB)
 (B) Troponin I
 (C) Troponin T
 (D) EKG
 (E) Exercise stress test

- 8 A 4-year-old previously healthy girl presents to the ED with a 2-day history of cough productive of yellow sputum, fevers up to 102.4°F, pleuritic chest pain, and dyspnea. On examination, she is tachypneic and mildly toxic appearing. Her chest x-ray reveals a right middle lobe infiltrate. Which of the following organisms is the most likely cause of this problem?

(A) *Klebsiella pneumoniae*
 (B) *Mycoplasma pneumoniae*
 (C) *Chlamydia trachomatis*
 (D) Respiratory syncytial virus (RSV)
 (E) *Streptococcus pneumoniae*

- 9 An ED thoracotomy is performed on a trauma patient. Which of the following is the structure labeled in Fig. 6-1?



Figure 6-1.

(A) Vagus nerve
 (B) Phrenic nerve
 (C) Sympathetic chain
 (D) Spinal accessory nerve
 (E) Inferior vena cava

- 10 Which of the following statements about *Yersinia enterocolitica* infection is true?

(A) *Y. enterocolitica* gastroenteritis may mimic appendicitis.
 (B) Unlike other causes of gastroenteritis, *Yersinia enterocolitica* may last for 2 weeks or longer.
 (C) Some adults recovering from *Yersinia enterocolitica* may develop polyarthritis or erythema nodosum.
 (D) *Y. enterocolitica* infections are most common in childhood.
 (E) All of the above.

- 11 Which of the following EKG changes may be seen in the setting of hypercalcemia?

(A) ST-segment depression
 (B) QTc-segment shortening
 (C) Widened T wave
 (D) Bradycardia
 (E) All of the above

- 12 Which of the following is true regarding retropharyngeal abscesses (RPAs)?

(A) RPAs are usually preceded by foreign body aspiration in children.
 (B) Patients with RPAs generally prefer to lie supine.
 (C) Prevertebral soft tissue swelling in excess of 22 mm at the level of C2 is diagnostic for an RPA in children and adults.
 (D) *Mycobacterium spp.* are the most common cause of RPAs.
 (E) Atlantoaxial separation is the most common fatal complication of RPAs.

- 13 Which of the following is true about treatment of multiple sclerosis (MS)?

(A) Intrathecal baclofen may be useful for the spasticity associated with MS.
 (B) Patients with acute exacerbations become less responsive to corticosteroids over time.
 (C) Treatment of optic neuritis with oral prednisone alone may increase the rate of recurrence.
 (D) High-dose methylprednisolone has been shown to speed recovery from acute exacerbations but does not affect long-term outcome.
 (E) All of the above.

- 14 A 23-year-old man with a history of human immunodeficiency virus (HIV) presents with shortness of breath, fever, and malaise. A chest x-ray is shown. Arterial blood gas shows a P_{aO_2} of 60 mmHg. Which of the following, in addition to antibiotics, is the most appropriate therapy in Fig. 6-2?

(A) Albuterol
 (B) Prednisone



Figure 6-2.

- (C) Aspirin
(D) Vasopressin
(E) Hyperbaric oxygen
- 15** D-dimer levels may be elevated in which of the following?
(A) Elderly patients
(B) Pregnancy
(C) Multiple blunt trauma victims
(D) Postoperative patients
(E) All of the above
- 16** Which of the following has been shown to increase the risk of brain tumors?
(A) High-tension power lines
(B) Ionizing radiation
(C) Head trauma
(D) Cellular telephone use
(E) All of the above
- 17** A 26-year-old pregnant woman at 8 weeks by dates presents to the ED with a chief complaint of nausea and vomiting. Her abdomen and pelvic examinations are normal and her ultrasonograph reveals a normal live intrauterine pregnancy at 8 weeks. Her urine reveals no ketones. Which of the following is the best recommendation for reducing her symptoms?
(A) Diazepam
(B) Promethazine
(C) Vitamin B₆
(D) Ondansetron
(E) Dexamethasone
- 18** Which of the following is true regarding appendicitis?
(A) Nearly all patients with appendicitis younger than 3 years have evidence of perforation at the time of appendectomy.
(B) Most patients younger than 2 years have diffuse abdominal tenderness.
(C) An appendicolith is only seen in approximately 15% of cases.
(D) Computed tomography (CT) scan is the diagnostic test of choice.
(E) All of the above.
- 19** A 6-year-old boy presents with diffuse arthralgias, fatigue, and fever for several days. He had a "virus" with fever and sore throat several weeks before, which resolved spontaneously. Physical examination demonstrates a febrile child with significant tenderness and limited range of motion in his left knee with milder findings in his right wrist. Which of the following the most appropriate next step in management?
(A) Discharge home with azithromycin
(B) Prednisone 1 mg per kg
(C) EKG
(D) Urinalysis
(E) Lumbar puncture
- 20** Which of the following opioids may predispose to serotonin syndrome?
(A) Fentanyl
(B) Meperidine
(C) Propoxyphene
(D) Hydrocodone
(E) Morphine
- 21** Which of the following is the most appropriate suture to use for gaping intraoral lacerations involving the mucosal surface?
(A) 6-0 nylon
(B) 6-0 vicryl
(C) 4-0 nylon
(D) 4-0 vicryl
(E) 2-0 silk
- 22** A 34-year-old woman who takes phenelzine for depression presents with agitation, severe hypertension, mydriasis, and hyperthermia. Which of the following foods did she most likely eat before presentation?
(A) Oranges
(B) Apples
(C) Graham crackers
(D) Cheese
(E) Ice cream

23. A 6-month-old infant born at term is brought by her parents for evaluation of cough. The patient has been coughing for 3 days, with rhinorrhea and congestion and fevers up to 101°F. Her past medical history and birth history are unremarkable. Vital signs in the ED are 100.1°F, 133, 42, 90/palp, and 98% RA. The patient is smiling, active, and tachypneic with mild nasal flaring, and lungs exhibit moderate expiratory wheezes. Which of the following is true regarding this patient's condition?
- (A) Albuterol therapy has been shown to reduce hospitalization rates.
 - (B) Ribavirin is indicated.
 - (C) Respiratory syncytial virus (RSV) is the most common cause.
 - (D) Corticosteroids reduce the duration of illness.
 - (E) The patient has an 80% chance of developing asthma as a child.
24. The most commonly encountered anorectal problem encountered in infants is
- (A) Anal fissure.
 - (B) Hemorrhoids.
 - (C) Fistula.
 - (D) Ischiorectal abscess.
 - (E) Pilonidal cyst.
25. Which of the following drugs may pose problems for a patient with asthma?
- (A) Naproxen
 - (B) Metoprolol
 - (C) Enalapril
 - (D) Aspirin
 - (E) All of the above
26. A 42-year-old anxious woman presents to the ED with low back pain radiating down her left leg. She states that she has a history of a herniated disk but has never had advanced imaging or surgery. While the patient is lying supine, you lift her right leg to approximately 45 degrees, causing the patient to complain of pain radiating down her left leg below the knee. How do you interpret this result?
- (A) The patient is malingering.
 - (B) The patient probably has a vertebral compression fracture.
 - (C) The patient has cauda equina syndrome.
 - (D) The patient has a lumbar radiculopathy probably caused by a left-sided herniated disk.
 - (E) The patient has crossed sensory nerve fibers resulting in paradoxical left-sided pain.
27. Which of the following is an absolute contraindication to the use of epinephrine in anaphylaxis?
- (A) Age older than 85 years
 - (B) Pulse > 125
 - (C) Systolic BP > 185
 - (D) Known coronary artery disease (CAD)
 - (E) None of the above
28. The use of noninvasive positive pressure ventilation (NIPPV) in the setting of an acute chronic obstructive pulmonary disease (COPD) exacerbation has been shown to:
- (A) Decrease the need for endotracheal intubation.
 - (B) Decrease the duration of mechanical ventilation.
 - (C) Decrease the length of intensive care unit (ICU) stay.
 - (D) Do all of the above.
 - (E) Do none of the above
29. Which of the following is an expected laboratory abnormality in patients with the (HELLP) syndrome?
- (A) Decreased hemoglobin
 - (B) Elevated prothrombin time (PT)
 - (C) Decreased fibrinogen
 - (D) Elevated partial thromboplastin time (PTT)
 - (E) All of the above
30. Which of the following findings on urinalysis is found in pyelonephritis but not cystitis?
- (A) White blood cells (WBCs)
 - (B) WBC casts
 - (C) Nitrites
 - (D) Leukocyte esterase
 - (E) Bacteria
31. Which of the following is true regarding toxic alcohols?
- (A) Alcohol dehydrogenase has greater affinity for methanol than for ethanol.
 - (B) Alcohol dehydrogenase has greater affinity for ethylene glycol than for ethanol.
 - (C) Alcohol dehydrogenase has greater affinity for ethylene glycol than for methanol.
 - (D) As little as one tablespoon of 40% methanol may be lethal in adults.
 - (E) Gastrointestinal (GI) absorption of both methanol and ethylene glycol takes 4 to 5 hours
32. A 26-year-old woman at 31 weeks' gestation is brought to the ED after a high-speed motor vehicle accident. She was an unrestrained passenger but was not ejected from the vehicle. She is brought in lying on a backboard with a c-collar and is complaining of difficulty breathing. Her room air oxygen saturation reads 82%, although it increases to 93% on a nonrebreather. Just before intubation, a

chest x-ray was taken and is shown in Fig. 6-3. Which of the following is true?

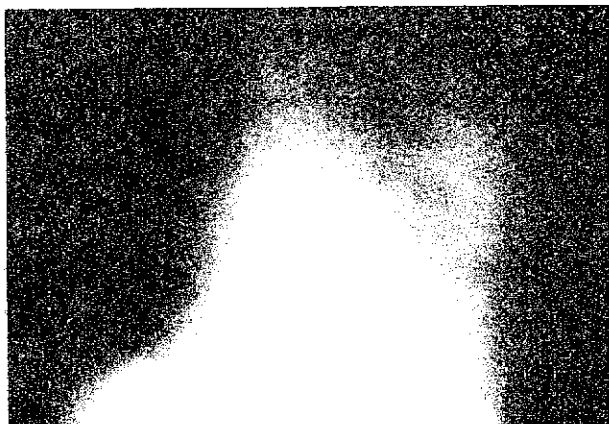


Figure 6-3.

- (A) Chest tubes should be placed in the fifth intercostal space at the midaxillary line.
 (B) Chest tubes should be placed over the anterior chest wall.
 (C) Chest tubes are contraindicated during pregnancy.
 (D) Chest tubes should be deferred until fetal evaluation is complete.
 (E) Chest tubes should be placed higher in pregnant than in nonpregnant women.
- 33** Pulmonary infections with which of the following may be transmitted from person to person?
 (A) *Coxiella burnetii*
 (B) *Yersinia pestis*
 (C) *Histoplasma capsulatum*
 (D) *Francisella tularensis*
 (E) *Bacillus anthracis*
- 34** A 55-year-old man presents with severe chest pain radiating to the back. A CT scan of the chest reveals both ascending and descending aortic dissection. Which of the following is true regarding this patient?
 (A) Early, aggressive BP control is likely to be detrimental to outcome.
 (B) Emergent surgery is warranted.
 (C) Aspirin should be given in case the dissection has extended to the coronary arteries.
 (D) Heart rate (HR) should be kept >100 to maximize cardiac output.
 (E) Transthoracic echocardiogram has the best specificity to make the diagnosis.
- 35** A 36-year-old primigravida presents to the ED at 32 weeks' gestation with epigastric pain. Her BP is 150/100, but the other vital signs are normal. While the nurse is performing his assessment in the room, the patient begins to seize. The next best step in management is
 (A) Hydralazine 10 mg IV push.
 (B) Lorazepam 2 mg per minute IV push.
 (C) Phenytoin 20 mg per kg IV.
 (D) Magnesium 6 g slow IV push.
 (E) Labetalol 20 mg slow IV push.
- 36** Erysipelas . . .
 (A) Is almost always caused by *S. aureus*.
 (B) Most frequently involves the face.
 (C) Rarely recurs.
 (D) Is an infection of the dermis that involves the lymphatic system.
 (E) Is all of the above.
- 37** A 23-year-old woman with a history of sickle cell disease presents with fever, chills, cough, and dyspnea. A chest x-ray demonstrates a focal infiltrate in the right lower lobe. Which of the following is the most appropriate management at this time?
 (A) Heparin
 (B) Tissue plasminogen activator
 (C) Percutaneous transluminal coronary angioplasty
 (D) Albuterol and prednisone
 (E) Intravenous fluids
- 38** A group of children are playing outside in the rain when one of them suffers a witnessed lightning strike. The strike did not directly hit the child but it hit the ground very close to where the child was standing. Which of the following is true?
 (A) Ventricular fibrillation is the most common cause of death.
 (B) He is likely to suffer from severe, deep burns.
 (C) Lower extremity paralysis accompanied by mottled, blue, cool, and pulseless extremities typically resolves without treatment.
 (D) "Flashover" commonly causes diffuse superficial burns to >50% of the total body surface area.
 (E) Myoglobinuric renal failure is the most common complication amongst survivors.
- 39** A 26-year-old G₂P₂ presents to the ED 3 days after spontaneous vaginal delivery of a healthy male infant with a chief complaint of crampy low abdominal pain and a foul smelling vaginal discharge. On examination, she has a fever of 102°F, and a tender uterus on bimanual pelvic examination. Which of the following is true?
 (A) This condition is more common after vaginal delivery than cesarean section.

- (B) She has postpartum pelvic inflammatory disease.
- (C) *Chlamydia* and *Mycoplasma* are the most common etiologic agents.
- (D) Premature rupture of membranes (PROM) is a risk factor for her condition.
- (E) All of the above.
- 40 Which of the following patients is at highest risk of developing a lung abscess?
- (A) A 28-year-old HIV+ man with a recent CD4⁺ T-cell count of 301
- (B) A 47-year-old woman status post lumpectomy for breast cancer
- (C) A 68-year-old woman drunk alcoholic with diffuse caries
- (D) A 32-year-old man with a history of polypharmacy abuse including IV drug use
- (E) A 72-year-old woman with Parkinson disease
- 41 Which of the following diseases produces palpable purpura?
- (A) Idiopathic thrombocytopenic purpura (ITP)
- (B) Thrombotic thrombocytopenic purpura (TTP)
- (C) Henoch-Schönlein purpura (HSP)
- (D) Rocky Mountain spotted fever (RMSF)
- (E) All of the above
- 42 The drug of choice for sedation in the setting of acute delirium is
- (A) Haloperidol.
- (B) Diazepam.
- (C) Diphenhydramine.
- (D) Morphine.
- (E) Promethazine.
- 43 Which of the following statements about *Pseudomonas aeruginosa* is correct?
- (A) Most patients with cystic fibrosis (CF) are ultimately colonized with *P. aeruginosa* and are susceptible to infection.
- (B) Ceftriaxone plus azithromycin, a common front-line regimen for community-acquired pneumonia (CAP), provides antipseudomonal coverage.
- (C) *P. aeruginosa* is less common among patients admitted to the ICU with severe pneumonia.
- (D) *P. aeruginosa* is an important cause of malignant otitis media.
- (E) *P. aeruginosa* has only a small role in causing nosocomial infections.
- 44 Which of the following is the most common class of psychiatric disorder seen by primary care physicians?
- (A) Thought disorder
- (B) Recreational drug use
- (C) Anxiety disorder
- (D) Somatoform disorder
- (E) Factitious disorder
- 45 Which of the following is true of Prinzmetal's angina?
- (A) It is not relieved by nitroglycerin.
- (B) It may be relieved by exercise.
- (C) The pathophysiology involves acute plaque rupture with thrombosis.
- (D) Characteristic EKG changes usually distinguish Prinzmetal's from acute myocardial infarction (MI).
- (E) β -Blockers are contraindicated
- 46 Which of the following is the most common symptom seen in pulmonary embolism (PE)?
- (A) Dyspnea
- (B) Chest pain
- (C) Unilateral lower extremity edema
- (D) Palpitations
- (E) Hemoptysis
- 47 Which of the following is most effective in reducing mortality from acute MI?
- (A) Metoprolol
- (B) Aspirin
- (C) Nitroglycerin
- (D) Abciximab
- (E) Morphine
- 48 A third-year medical student presents to the ED with diffuse arthralgias of the hands, wrists, and knees. She has been taking isoniazid (INH) because she was exposed to a patient with active tuberculosis and subsequently had a positive purified protein derivative (PPD) test. She is most likely suffering from a syndrome mimicking:
- (A) Systemic sclerosis.
- (B) Systemic lupus erythematosus (SLE).
- (C) Gouty arthritis.
- (D) Rheumatoid arthritis.
- (E) Sjögren syndrome.
- 49 The amount of time after which a limb exposed to ischemia at room temperature ("warm ischemia") begins to develop irreversible damage is
- (A) 1 hour.
- (B) 3 hours.
- (C) 6 hours.
- (D) 12 hours.
- (E) 24 hours.

- 50** A 56-year-old man with chronic hepatitis B presents with mild abdominal pain, weight loss, and weakness. A CT scan of his abdomen revealed a hypodense lesion in the right lobe of his liver suspicious for hepatocellular carcinoma. Which of the following blood tests is likely to be helpful?

(A) Beta human chorionic gonadotropin (β -hCG) level
 (B) Serum total estradiol level
 (C) Alpha fetoprotein (AFP) level
 (D) Carcinoembryonic antigen (CEA)
 (E) Cancer antigen (CA) 19-9

- 51** A 56-year-old man presents with generalized fatigue, weakness, and vomiting. He tells you that he has taken an overdose of his doxepin medication. His BP is 155/95, and his EKG demonstrates a regular, wide-complex tachycardia. Which of the following is the most appropriate next step in management?

(A) Cardioversion at 50 J
 (B) Lidocaine
 (C) Procainamide
 (D) Sodium bicarbonate
 (E) Propafenone

- 52** A 47-year-old female smoker with a history of hypertension presents to the ED with a headache

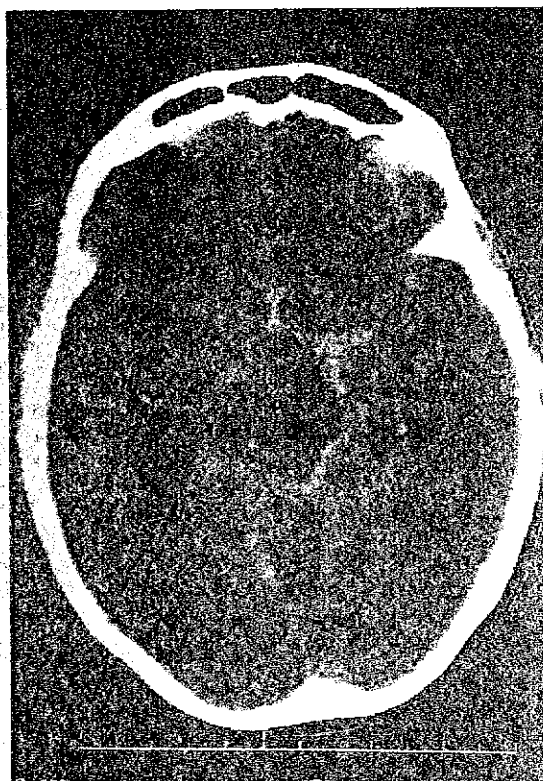


Figure 6-4.

that started 12 hours ago. She looks uncomfortable, prefers to sit in a dark room and states this headache is more severe than any headache she has had before. Her CT scan is shown in Fig. 6-4. Which of the following is true?

(A) Seizures may occur in up to one third of patients.
 (B) Lumbar puncture should be performed for cerebrospinal fluid (CSF) analysis.
 (C) Nifedipine 60 mg PO should be given as soon as the CT scan result is obtained.
 (D) Hypertension should only be treated if her BP exceeds 220/120.
 (E) All of the above.

- 53** A 25-year-old man is punched in the face at a bar and presents to you with dental pain. On examination, his right lower first premolar has a fracture exposing yellowish surface. No blood is seen on the tooth. Which of the following is the correct type of fracture and what is the proper management?

(A) Ellis I; follow up in dental clinic in 1 week.
 (B) Ellis I; follow up in dental clinic next day.
 (C) Ellis II; follow up in dental clinic in 1 week.
 (D) Ellis II; follow up in dental clinic next day.
 (E) Ellis III; immediate dental consult.

- 54** Which of the following is the most commonly broken carpal bone?

(A) Lunate
 (B) Triquetrum
 (C) Trapezoid
 (D) Trapezium
 (E) Scaphoid

- 55** Which of the following is the most common cause of death among African American adolescents?

(A) Infection
 (B) Cancer
 (C) Motor vehicle collision
 (D) Gunshot wound
 (E) Drug overdose

- 56** Which of the following is the most common misdiagnosis in cases of missed acute appendicitis in pediatric patients?

(A) Mesenteric adenitis
 (B) Intussusception
 (C) Gastroenteritis
 (D) Inflammatory bowel disease
 (E) Pancreatitis

- 57 A 4-year-old girl presents with signs and symptoms of cystitis. Which of the following is the most appropriate initial treatment?

(A) Amoxicillin-clavulanic acid
 (B) Ciprofloxacin
 (C) Doxycycline
 (D) Trimethoprim-sulfamethoxazole
 (E) Gentamicin

- 58 A 67-year-old man with hypertension presents with acute onset of abdominal pain. The pain is periumbilical and radiates to the left lower quadrant. On physical examination, BP is 140/90, and an abdominal mass is noted near the umbilicus. A bedside ultrasonograph is shown in Fig. 6-5. After the ultrasonography, the BP drops to 70/40 and the patient becomes lightheaded and dizzy. Which of the following is the most appropriate next step in management?

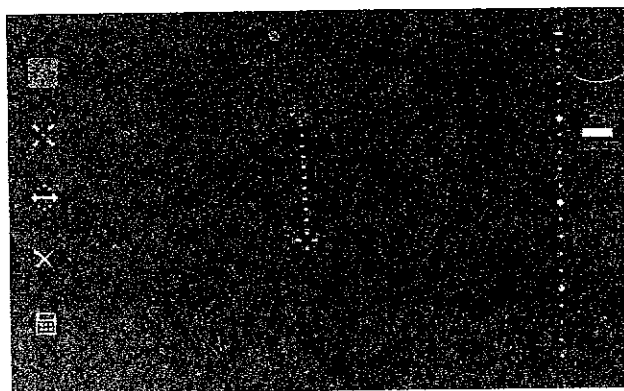


Figure 6-5.

- (A) CT scan without contrast
 (B) CT scan with IV contrast only
 (C) CT scan with IV and PO contrast
 (D) Emergent surgery
 (E) IV crystalloid to normalize BP
- 59 Which of the following most commonly complicates normal labor and delivery?
- (A) Face presentation
 (B) Breech presentation
 (C) Shoulder dystocia
 (D) Brow presentation
 (E) Abnormal fetal lie
- 60 A 45-year-old man presents with acute onset of left flank pain. He is extremely uncomfortable and writhing around in pain. After appropriate pain control, he is sent for a CT scan of the abdomen and pelvis, which demonstrates a 2-mm kidney stone

in his mid-right ureter. Which of the following is true regarding this patient?

- (A) He is likely to pass the stone without further medical intervention.
 (B) Urinalysis is likely to be completely normal.
 (C) The stone has already traversed the narrowest portion of the ureter.
 (D) Strict fluid restriction is the management of choice.
 (E) The stone is most likely composed of cystine.
- 61 A 44-year-old alcoholic man presents with shortness of breath, fever, and productive cough. Chest x-ray demonstrates a left lower lobe infiltrate. The diagnosis of pneumonia is made. Which of the following is the most likely cause?
- (A) *Staphylococcus aureus*
 (B) *S. pneumoniae*
 (C) *K. pneumoniae*
 (D) *Mycobacterium tuberculosis*
 (E) *M. pneumoniae*
- 62 Which of the following is the correct diagnosis of the injury shown in Fig. 6-6?

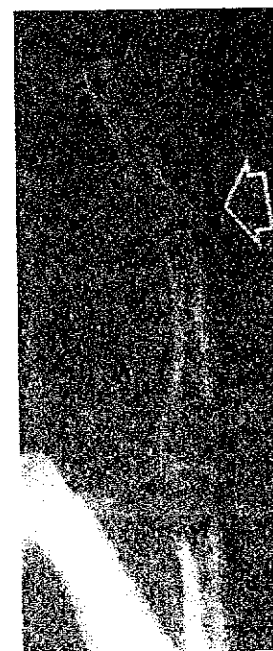


Figure 6-6.

- (A) Trigger finger
 (B) Mallet finger
 (C) Bennett fracture
 (D) Jersey finger
 (E) None of the above

- 63 Which of the following is true regarding hyperkalemia?
- (A) Neither calcium chloride nor calcium gluconate should ever be used in the setting of concomitant digoxin use.
 - (B) The effects of calcium chloride or gluconate last for 3 to 4 hours.
 - (C) Bicarbonate therapy is more efficacious than either insulin or albuterol.
 - (D) Sodium polystyrene sulfate (Kayexalate) may exacerbate volume overload.
 - (E) All of the above.
- 64 Which of the following is true regarding the physical examination for patients with an abdominal aortic aneurysm (AAA)?
- (A) Abdominal bruits are audible in half the number of cases.
 - (B) Aneurysmal rupture often occurs with deep palpation of the abdomen.
 - (C) Most aneurysms > 5 cm in size are palpable.
 - (D) Femoral pulses are usually decreased.
 - (E) Abdominal obesity does not appreciably affect the ability to palpate an aortic aneurysm.
- 65 Which of the following is the most common etiology of death from child abuse?
- (A) Retroperitoneal hemorrhage
 - (B) Hemothorax
 - (C) Intracranial hemorrhage
 - (D) Burns
 - (E) Drowning
- 66 The typical sequence of color changes in the fingers of patients experiencing Raynaud's phenomenon is
- (A) Blue to white to red.
 - (B) Red to white to blue.
 - (C) White to red to blue.
 - (D) White to blue to red.
 - (E) Blue to red to white.
- 67 A previously healthy 5-year-old boy presents with painless rectal bleeding. The bleeding seems to have resolved but his mother states that he had four or five large, brick-colored stools earlier in the day. His stool guaiac test is positive. Which of the following is the most likely cause of his symptoms?
- (A) Duodenal ulcer
 - (B) Meckel's diverticulum
 - (C) Esophagitis
 - (D) Anal fissure
 - (E) Inflammatory bowel disease
- 68 The treatment of choice for scabies (*Sarcoptes scabiei*) is
- (A) Permethrin 5% cream.
 - (B) Lindane 1% lotion.
 - (C) Malathion 0.5% lotion.
 - (D) Fluconazole 150 mg PO.
 - (E) Ivermectin 200 mg per kg PO.
- 69 A 19-year-old woman presents with unilateral purulent discharge out of her left eye that started the day before presentation and is worse now. She has blurry vision until she is able to wipe the pus out of her eye. On review of systems, she notes nausea, intermittent fevers for the past few days, lower abdominal pain, and dysuria. Slit lamp examination demonstrates a purulent discharge, but no corneal or anterior chamber abnormalities. Which of the following is the most appropriate management strategy?
- (A) Topical antibiotics, follow up with ophthalmology in 2 days
 - (B) Topical antivirals, follow up with ophthalmology in 2 days
 - (C) Systemic antibiotics, admission to hospital
 - (D) Systemic antivirals, admission to hospital
 - (E) Topical and systemic antibiotics, admission to hospital
- 70 A 28-year-old man presents to the ED stating that he drank a whole bottle of antifreeze 4 hours before presentation. He had drunk a fifth of liquor just before drinking the antifreeze. Except for moderate intoxication, he is asymptomatic and his vital signs and physical examination are normal. Which of the following is the most appropriate next step in management?
- (A) Discharge him without further testing.
 - (B) Check an oxalic acid level and discharge him if < 50 mg per dL.
 - (C) Check urine for crystals and discharge him if negative.
 - (D) Check urine for fluorescence and discharge him if negative.
 - (E) Check an ethanol level and administer fomepizole if negative.
- 71 A 44-year-old man presents with hypotension after a motor vehicle collision. His chest x-ray is normal. Pelvis x-ray is shown in Fig. 6-7. Which of the following is the most important next step in management?

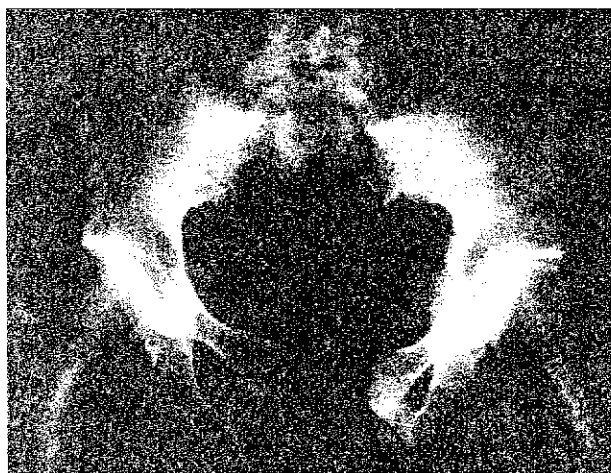


Figure 6-7.

- (A) Foley catheterization
- (B) CT scan of the abdomen and pelvis
- (C) Tightening a bedsheet around the pelvis
- (D) ED thoracotomy
- (E) Inlet and outlet radiographs of the pelvis

72 A 34-year-old woman presents with fever, headache, and blurry vision. Physical examination reveals complete oculomotor paralysis bilaterally. A CT scan of the brain with IV contrast is shown in Fig. 6-8. Which of the following is the most likely etiologic agent?

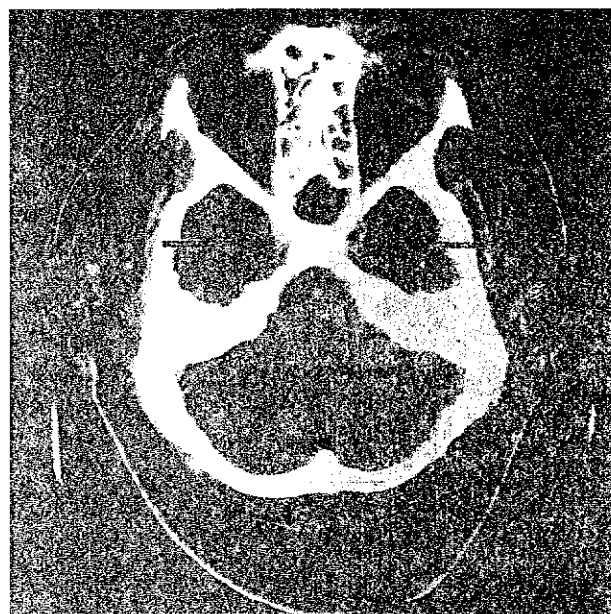


Figure 6-8.

- (A) *S. aureus*
- (B) *H. influenzae*

- (C) *N. meningitidis*
- (D) *N. gonorrhoeae*
- (E) *P. aeruginosa*

- 73** Which of the following arteries supplies the atrioventricular (AV) node in most people?
- (A) Left coronary artery
 - (B) Right coronary artery
 - (C) Left anterior descending artery
 - (D) Left circumflex artery
 - (E) Right posterior descending
- 74** Which of the following is first-line therapy for seizure prophylaxis in the patient with head injury?
- (A) Pentobarbital
 - (B) Phenobarbital
 - (C) Phenytoin
 - (D) Valproate
 - (E) Carbamazepine
- 75** Which of the following is true in alcoholic ketoacidosis (AKA)?
- (A) Insulin is useful in management.
 - (B) The alcohol level is usually >100 mg per dL.
 - (C) The osmolal gap is usually elevated.
 - (D) β -hydroxybutyrate is the primary ketone responsible for the acidosis.
 - (E) All of the above.
- 76** Which of the following findings is present in most patients with endocarditis?
- (A) Signs of embolic stroke
 - (B) Painful subcutaneous nodules on finger pads
 - (C) Heart murmur
 - (D) Splenomegaly
 - (E) Petechiae
- 77** A 31-year-old G₄P₃ presents to the ED in active labor at 38 weeks' gestation. On examination, the patient is maximally dilated and the umbilical cord is noted at the cervical opening. Which of the following may be helpful?
- (A) Place the mother on a stretcher in Trendelenburg position.
 - (B) Place a Foley catheter and instill the bladder with 750 mL of saline.
 - (C) Place the mother's legs in a knee to chest position.
 - (D) Elevate the presenting fetal part to relieve compression on the umbilical cord.
 - (E) All of the above.

- 78** A patient presenting to the ED with which of the following is *least* likely to have audible wheezes on physical examination?
- (A) Congestive heart failure (CHF)
 - (B) COPD
 - (C) Aspirated foreign body
 - (D) Asthma
 - (E) Sarcoidosis
- 79** What is chalcosis?
- (A) A teardrop pupil associated with incomplete closure of fetal ocular cleft.
 - (B) An inflammatory reaction to copper-containing intraocular foreign body.
 - (C) Streaming fluorescent dye seen on slit lamp examination.
 - (D) Shimmering of iris associated with posterior lens dislocation.
 - (E) Double pupil seen with blunt trauma.
- 80** A 57-year-old woman with hypertension who has not seen a doctor in 30 years presents with weakness and fatigue. The EKG is shown in Fig. 6-9. Which of the following is the most appropriate next step in management?
- (A) Defibrillation at 200 J
 - (B) Cardioversion at 50 J
 - (C) Lidocaine 150 mg IV
 - (D) Calcium gluconate 100 mg/kg IV
 - (E) No acute management, follow-up with primary care
- 81** A 65-year-old man with end-stage renal disease (ESRD), who is on hemodialysis, presents with progressively worsening dyspnea over the last 3 days. Which of the following is the most likely cause for his symptoms?
- (A) MI
 - (B) Volume overload
 - (C) Pneumonia
 - (D) Pulmonary embolism (PE)
 - (E) Diabetic ketoacidosis
- 82** A 25-year-old woman presents with progressively worsening right eye vision loss and pain with extraocular movements over the last 3 days. An afferent papillary defect is present on the right, and direct fundoscopic examination reveals a swollen optic disc. You make the diagnosis of optic neuritis. The patient is very concerned that her vision loss may be an early sign of MS. You tell her that her risk of developing MS within 5 years is approximately:
- (A) 5%.
 - (B) 25%.
 - (C) 50%.
 - (D) 75%.
 - (E) 100%.
- 83** Women are affected by gout:
- (A) Very rarely.
 - (B) Most commonly in childhood.
 - (C) Most commonly during their adult years.



Figure 6-9. (See color insert.)

- (D) Most commonly in their postmenopausal years.
 (E) Mostly in the hip joints.
- 84 Neglect or "hemi-inattention" usually indicates a stroke in which of the following distributions?
 (A) Frontal lobe
 (B) Occipital lobe
 (C) Left hemisphere
 (D) Right hemisphere
 (E) Brainstem
- 85 Comatose patients with bilateral miosis thought to be due to narcotic overdose may sometimes be confused with patients with which of the following?
 (A) Lateral medullary syndrome
 (B) Locked-in syndrome
 (C) Pontine hemorrhage
 (D) Pseudobulbar palsy
 (E) Retinal detachment
- 86 A 10-year-old boy presents with chest pain. Which of the following is the most likely cause?
 (A) Cardiac
 (B) Gastrointestinal (GI)
 (C) Psychogenic
 (D) Musculoskeletal
 (E) Endocrine
- 87 Which of the following is true regarding anticholinergic crises?
 (A) Seizures are seen more commonly in adults than in children.
 (B) Hyperthermia is a significant cause of death in patients who receive adequate supportive care.
 (C) Reduced gastric motility is the earliest sign.
 (D) Sympathomimetic and anticholinergic crises are clinically indistinguishable.
 (E) Nicotinic antagonism exceeds muscarinic antagonism.
- 88 Which of the following is true regarding cancer of the biliary tree?
 (A) Cholangiocarcinoma is the most common primary biliary tract malignancy.
 (B) Metastatic disease to the biliary tract is more common than any primary malignancy.
 (C) Porcelain gallbladder is a risk factor for gallbladder carcinoma.
 (D) The most common presenting symptom of gallbladder carcinoma is pruritus.
 (E) All of the above.
- 89 An 18-year-old man presents with fever and left periorbital pain and swelling as shown in Fig. 6-10. Which of the following additional tests is indicated at this time?

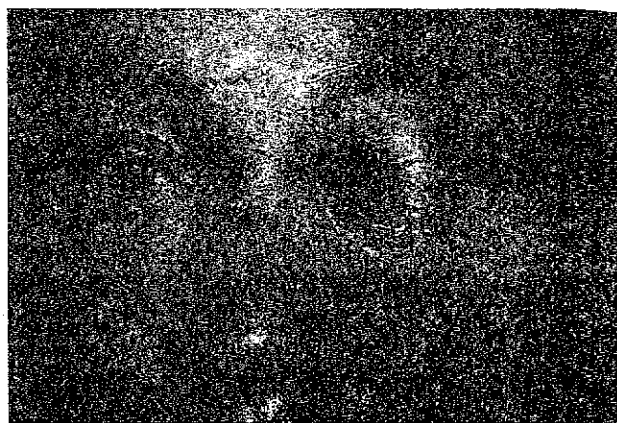


Figure 6-10.

- (A) Brain magnetic resonance imaging (MRI)
 (B) Orbital CT scan
 (C) Erythrocyte sedimentation rate (ESR)
 (D) Cerebrospinal fluid (CSF) analysis
 (E) Slit lamp examination
- 90 A 17-year-old man presents with pain and swelling in his right knee. He denies any trauma. He had pain in his left ankle the week before, and pain in his right wrist before that. He had a sore throat last month, which spontaneously resolved after 1 week. Physical examination demonstrates a blowing apical systolic murmur and a tender effusion in his right knee. He complains of shortness of breath and chest pain, so an EKG is ordered. Which of the following is the most likely EKG abnormality in this patient?
 (A) Prolonged PR interval
 (B) Wide QRS complex
 (C) ST depression
 (D) Prolonged QT interval
 (E) S1-Q3-T3 morphology
- 91 Which of the following is the optimal vascular access for adult trauma patients?
 (A) Single 14-g peripheral IV
 (B) Double 16-g peripheral IVs
 (C) Double 18-g peripheral IVs
 (D) Single triple lumen catheter
 (E) Intraosseous catheter

- 92 Which of the following is the biggest risk factor for delirium in the elderly?
- (A) Hearing impairment
 - (B) Immobility
 - (C) Underlying depression
 - (D) History of multiple falls
 - (E) Underlying chronic dementia
- 93 A 22-year-old male basketball player presents to the ED after developing sudden shortness of breath and a painful sensation on the left side of his chest, which worsens with breathing. Initial chest x-ray reveals a 15% pneumothorax at the left apex. The patient's vitals are 128/72, P 95, RR 22 and shallow, and PO_2 of 97%. The best course of action is
- (A) Administer supplemental O_2 , and admit the patient to the hospital for 24-hour observation with repeat chest films q 6 hours.
 - (B) Administer supplemental O_2 , observe the patient in the ED, and repeat a chest film in 3 to 6 hours.
 - (C) Discharge the patient home with routine follow-up the next day with his *Pneumocystis carinii* pneumonia (PCP).
 - (D) Insert a chest tube and connect it to water-seal.
 - (E) Consult cardiothoracic surgery (CT)-surgery.
- 94 A 32-year-old man presents to the ED after an accident while cleaning a paint sprayer. He had been using an industrial caliber paint sprayer to work on the exterior of his house and was trying to dislodge an apparent clog in the nozzle when he inadvertently triggered the sprayer with his index finger over the nozzle. He now comes in with mild pain and a nearly punctate wound at the tip of his left index finger. Which of the following is the next best step in management?
- (A) Tetanus prophylaxis, oral antibiotics, splint in the "safe" position and discharge with orthopedic follow-up in 2 days.
 - (B) Tetanus prophylaxis, irrigate the wound with tap water, oral antibiotics, and discharge with orthopedic follow-up in 2 days.
 - (C) Hand surgeon consultation for immediate operative debridement.
 - (D) Tetanus prophylaxis, oral antibiotics, incision, and drainage of the volar tip of the finger.
 - (E) Tetanus prophylaxis, oral antibiotics, and digital block with thorough wound exploration to determine the extent of injury.
- 95 Which of the following is true regarding rhabdomyolysis?
- (A) Hypercalcemia is the most common electrolyte abnormality.
 - (B) Detection of serum myoglobin is the most sensitive means of diagnosing rhabdomyolysis.
 - (C) Use of 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors ("statins") may cause myalgias but not rhabdomyolysis.
 - (D) Rhabdomyolysis occurs in 90% of patients who survive a high-voltage electrical injury.
 - (E) Influenza and *Legionella* are the most common infectious causes of rhabdomyolysis.
- 96 Which of the following mushroom toxins is known to cause hepatotoxicity?
- (A) Coprine
 - (B) Ibotenic acid
 - (C) Amatoxin
 - (D) Orellanine
 - (E) Psilocybin
- 97 Which of the following toxins is suggested by a fruity odor to the breath?
- (A) Cyanide
 - (B) Isopropanol
 - (C) Salicylate
 - (D) Acetaminophen
 - (E) Arsenic
- 98 A 34-year-old man with a history of leukemia on active chemotherapy presents with fever of 102.5°F. He denies any symptoms except for fever and chills. Physical examination is normal except for the fever. Basic laboratory work is normal except for a total WBC count of 400 cells per mm^3 . Which of the following is the most appropriate next step in management?
- (A) Discharge home with oncology follow-up
 - (B) Discharge home with oral amoxicillin and oncology follow-up
 - (C) Admission to hospital with broad-spectrum antibiotics
 - (D) Admission to hospital with surgical consultation
 - (E) Admission to medical ICU
- 99 Which of the following is a risk factor for central retinal artery occlusion (CRAO)?
- (A) Hypertension
 - (B) Systemic lupus erythematosus (SLE)
 - (C) Atrial fibrillation
 - (D) Diabetes mellitus
 - (E) All of the above are risk factors.

100 A 34-year-old man presents after a high-speed motor vehicle collision with shortness of breath. A large flail segment is noted on his right lateral chest. Which of the following is the most appropriate therapy at this time?

(A) Place the patient in the right lateral decubitus position.

(B) Place the patient in the left lateral decubitus position.

(C) Place a heavy weight on the flail segment.

(D) Give the patient 100% oxygen by nonrebreather mask.

(E) Perform rapid sequence intubation.

Answers and Explanations

1 Answer D. All of the drugs listed are useful for migraine prophylaxis, but only amitriptyline has been found useful in the prophylaxis of chronic tension-type headache. Propranolol is probably the first-line agent for migraine prophylaxis, whereas verapamil is the agent of choice for cluster headache prophylaxis.

2 Answer E. Because glucose exerts an osmotic pressure on cell membranes, water is extruded from cells into the intravascular space, thereby diluting plasma sodium. The sodium level must therefore be corrected for the hyperglycemia by using the following formula:

$$\text{Corrected Na}^+ = [\text{Na}^+] + (1.6 \times ([\text{Glucose}] - 100)/100)$$

While this patient's plasma concentration is at the low end of the normal range, patients with hyperosmolar hyperglycemic syndrome are typically severely sodium deplete. This occurs because sodium is lost in the urine as a result of extensive glycosuria.

3 Answer B. There are no validated criteria to determine which patients with respiratory symptoms should receive a chest x-ray. Furthermore, while the presence of a lobar infiltrate on a chest x-ray is a classic finding in "typical" bacterial pneumonia, it may also be present in cases of "atypical" pneumonia. Conversely, in the setting of a patient with clinical symptoms of pneumonia, a normal chest x-ray does not preclude a diagnosis of "typical" bacterial pneumonia. Therefore, chest x-rays are not useful to differentiate between typical and atypical pneumonia. However, abnormal findings on a chest x-ray remain central to making a diagnosis of pneumonia in patients with symptoms consistent with pneumonia. Although the World Health Organization (WHO) has established wholly clinical criteria for the diagnosis of pneumonia owing to the scarcity of resources in the developing world, most guidelines (e.g., IDSA, BTS) in developed nations include the presence of an infiltrate on a chest x-ray as central to the diagnosis. Lobar consolidation, however, is present in a minority of chest x-rays in patients with community-acquired pneumonia (CAP). Its presence, however, may point to *S. pneumoniae* or *K. pneumoniae* as the causative microbial agents. Chest x-rays that are performed very early in the disease course or in patients who are very dehydrated may be falsely negative, but most x-rays have at least some abnormality. Chest x-rays do not have a role in determining empiric antibiotic therapy in CAP.

4 Answer E. Organophosphates bind to and inhibit acetylcholinesterase, causing a cholinergic syndrome of systemic hypersecretion: bronchorrhea, diarrhea, lacrimation, salivation, emesis, and incontinence. Effects on heart rate (HR) are variable. Mortality from organophosphate overdose is usually due to hypoxia from excessive bronchorrhea. Treatment involves high-dose atropine—the endpoint of atropine therapy is the reduction of bronchial secretions. Tachycardia and hypertension are not indications to stop atropine therapy. Over time, the binding of organophosphates to acetylcholinesterase becomes irreversible. Pralidoxime acts to break up this complex before this process (known as aging) occurs.

5 Answer C. The patient has CHF from acute aortic regurgitation. The history of a new diastolic murmur with signs of pulmonary edema and normal EKG and cardiac markers indicates a valvular etiology. Surgical aortic valve replacement is the only definitive treatment for these patients. Choices A and E are appropriate for ST-elevation myocardial infarction (STEMI) and are not indicated here. Choice B is not indicated, as the EKG does not demonstrate dysrhythmia as a cause for the heart failure. Choice D may be indicated in cases of cardiogenic shock, but is not a definitive treatment.

6 Answer A. The incidence of *B. pertussis* infection is rising, with the number of reported cases in the United States increasing sixfold since 1980. This has occurred despite immunization rates of 80% among young children. Most of the increase is due to an increased number of adolescents and adults diagnosed with the disease. Furthermore, it is widely thought that the true scope of the problem is grossly underestimated because of the failure of physicians to recognize the illness, as well as their failure to report the illness when it is diagnosed. Almost all cases of pertussis in adolescents and adults occur in patients who have been previously vaccinated or in patients who have been previously infected with *B. pertussis*. Contrary to popular belief, neither *B. pertussis* infection, nor vaccination with either the cellular or acellular vaccine confers lifelong immunity. In fact, natural infection with *B. pertussis* results in approximately 15 years of immunity to reinfection. This is much greater than the 4 to 8 years' worth of immunity offered by the vaccines (the acellular vaccine, which is currently used in the United States offers a shorter duration of immunity than the

cellular vaccine, roughly from 4 to 6 years). The recommended vaccination schedule in the United States advises that infants are vaccinated at 2, 4, and 6 months of age, with boosters at 18 months and then again between 4 and 6 years of age. Therefore, most children born in the United States should carry immunity through the ages of 10 to 12 years of age. Because the most severe illness occurs in children less than 1 year of age, adolescents and adults have not been offered booster shots beyond childhood. However, because of the rising incidence of recognized disease in adolescents and adults, as well as the likely enormous asymptomatic disease burden in this population, recommendations to offer booster vaccinations to adults may be forthcoming. *B. pertussis* infection in adults ranges from subclinical infection to a prolonged illness mostly characterized by a nagging, paroxysmal cough, which may interfere with sleep. The mean duration of illness in adults is 36 to 48 days. Erythromycin is the drug of choice for the treatment of *B. pertussis* infection, although azithromycin and clarithromycin have been shown to be equally efficacious with fewer side effects. Trimethoprim-sulfamethoxazole is an additional alternative. Erythromycin is also recommended for prophylaxis of individuals who have come into contact with patients who are infected. It is thought to be effective in preventing disease as long as it is given before the onset of symptoms. Owing to the decreased infectivity of *B. pertussis* as the disease progresses, prophylaxis is generally unnecessary in individuals who come into contact with a patient who has been symptomatic for >3 weeks.

7 Answer D. Blunt cardiac injury results from blunt trauma directed at the sternum, usually from patients striking the steering wheel in a motor vehicle collision. Patients with blunt cardiac injury (formerly known as *cardiac contusion*) may develop myocardial stunning, CHF, dysrhythmia, and in rare instances, when a coronary vessel is damaged, MI. The diagnosis should be suspected in any case of blunt thoracic trauma, but physical examination is often not revealing. The best screening tool for the diagnosis is EKG. Patients with any significant abnormal finding on EKG should be admitted for observation, telemetry monitoring, and confirmatory echocardiogram. Cardiac markers have been extensively studied to evaluate for screening or confirming the diagnosis but are not particularly useful in either regard. Stress testing is not indicated in patients with suspected blunt cardiac injury, as the tachycardic response may actually exacerbate the traumatic insult.

8 Answer E. *S. Pneumoniae* (also known as *Pneumococcus*) is the most common bacterial cause of

pneumonia in preschool-aged children (6 months to 5 years). Overall, viruses are the most common pathogens causing pneumonia in this age-group, with respiratory syncytial virus (RSV) being the most common, followed by parainfluenza and influenza viruses, as well as adenovirus and rhinovirus. However, this patient did not present with a viral prodrome, and is mildly toxic upon examination. It is critical, therefore, to treat this patient with antibiotics that target *S. Pneumoniae*. Because of increasing resistance amongst *S. Pneumoniae* isolates, high-dose amoxicillin is the drug of choice, although patients who are hospitalized may require ampicillin, cefuroxime, or cefotaxime delivered intravenously. *K. pneumoniae* is an uncommon cause of pneumonia in children though it can cause severe infections in immunocompromised hosts. Community-acquired *Klebsiella* is primarily a disease of debilitated older men with a history of alcoholism. *M. pneumoniae* is the most common pathogen causing pneumonia in children aged 5 to 15 years. *C. trachomatis* may cause pneumonia in infants aged 3 weeks to 3 months, typically causing an afebrile, subacute interstitial pneumonia. RSV bronchiolitis and pneumonia are the primary causes for hospitalization during the first year of life.

9 Answer B. Emergency thoracotomy is indicated in patients who have traumatic arrest in the ED or shortly before arrival from penetrating thoracic trauma. The initial incision of the chest wall begins in the sternal area and sweeps along the superior border of the rib all the way laterally to the edge of the bed. The rib spreaders are then placed and the left lung is moved out of the way to expose the pericardium. An incision to the pericardium should be made anterior to the prominent phrenic nerve, which is visible in the figure. Damage to the phrenic nerve may cause diaphragmatic weakness and seriously impair respiratory function. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:22.)

10 Answer E. *Y. enterocolitica* most commonly causes an invasive disease of the terminal ileum with symptoms that are similar to other gastroenteritis syndromes (watery diarrhea, anorexia, crampy abdominal pain, malaise, vomiting). However, yersiniosis causes an invasive disease of the terminal ileum and cecum (or ileoceitis) in many adolescent and adult patients. The ileoceitis is characterized by a relative lack of diarrhea and closely mimics acute appendicitis. Also unique to yersiniosis is the duration of its symptoms, which often last

for 10 to 14 days or longer. Therefore, yersiniosis should be considered in any patient with symptoms of prolonged gastroenteritis. Though the disease is most common in childhood, adults experience postinfectious polyarthritides or erythema nodosum 2% to 5% of the time.

11 Answer E. The most commonly cited abnormality is QTc shortening, but any of the listed changes may occur.

12 Answer B. Patients with retropharyngeal abscesses (RPAs) generally prefer to lie supine to prevent the abscess and posterior wall edema from infringing upon their airway. Such patients should never be forced to sit upright. Although aggressive treatment of pediatric pharyngitis with early antibiotics has reduced the incidence of subsequent RPAs, children remain the most commonly affected group. This is due to the presence of large retropharyngeal lymph nodes in children younger than 4 years, which may become infected and subsequently develop into RPAs. Adults frequently present with a history of antecedent trauma, such as ingestion of a fish bone or caustic agents as well as vertebral fractures. Because the retropharyngeal lymph nodes rapidly involute after the ages of 4 to 6, adults usually require some insult to the intact retropharyngeal mucosa in order to develop a subsequent infection. An RPA should be suspected if the prevertebral soft tissue from the anteroinferior aspect of C2 to the border of the tracheal air column is >7 mm in children and adults or the same space at the level of C6 is >14 mm in children and 22 mm in adults. Although *M. tuberculosis* may cause an RPA, the most common cause is *Staphylococcus*. Finally, the most common fatal complication is airway obstruction. Atlantoaxial separation may occur due to damage of the transverse ligament of the atlas by the abscess. Such patients present with neurologic symptoms and an enlarged prevertebral space. All patients diagnosed with an RPA require immediate ENT consultation, admission to the ICU for airway monitoring, and broad spectrum antibiotic coverage.

13 Answer E. Patients presenting to the ED with exacerbations of MS should be admitted to the hospital for a course of high dose intravenous corticosteroids (typically methylprednisolone). However, the mechanism of action, the appropriate duration, and the potential benefits of this therapy are still not clear. An analysis of the Optic Neuritis Treatment Trial revealed that treatment of optic neuritis with prednisone alone may increase the risk of future episodes of MS and therefore, treatment with oral prednisone alone is not recommended. Furthermore, while it is

not clear why it occurs, patients with recurrent exacerbations of MS become less responsive to high-dose pulsed steroids over time. Baclofen is a useful agent for the spasticity that occurs in patients with MS, particularly in those who are wheelchair bound and cannot walk.

14 Answer B. This HIV patient has bilateral infiltrates consistent with *Pneumocystis carinii* pneumonia (PCP). Over three fourths of all patients with acquired immunodeficiency syndrome (AIDS) develop PCP at some point in their lifetimes. It is also the most common identifiable cause of death in patients with AIDS. *Pneumocystis* is classified as a protozoan, but has many characteristics of a fungus. Symptoms of PCP, like all pneumonias, include fever, cough, and shortness of breath, but a subacute or mild course is characteristic. Chest radiography classically demonstrates diffuse, bilateral interstitial infiltrates, but can be completely normal up to 20% of the time. First-line therapy with trimethoprim-sulfamethoxazole (TMP-SMX) is indicated. Adjunctive corticosteroid therapy is indicated in patients who have significant hypoxia ($\text{Paco}_2 < 70$ mm Hg). Albuterol may be used in patients with pneumonia or bronchitis who have a large bronchospasm component to their symptoms. Aspirin is not indicated in most infectious processes. Vasopressors may be used in patients with septic shock who are inadequately volume resuscitated. Hyperbaric oxygen does not currently have a role in management of PCP. (Figure courtesy of Mark Silverberg, MD. Reprint with permission from Silverberg M. *Greenberg text atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:1006.)

15 Answer E. Nearly all patients with venous thromboembolism have elevated D-dimer levels. Therefore, assays measuring D-dimer levels have proliferated, but they are a highly sensitive, but poorly specific screening test for pulmonary embolism (PE). Owing to the elevation in numerous other scenarios, an elevated D-dimer level can never be used as proof of the presence of a pulmonary embolus. However, because of the high sensitivity of most D-dimer assays (sensitivity varies depending on the assay used), normal D-dimer levels can safely rule out the presence of pulmonary embolus in very low-risk patients.

16 Answer B. Only ionizing radiation has been shown to increase the risk of tumors, as it may increase the incidence of meningiomas by a factor of 10 and the incidence of glial tumors by a factor of 3 to 7. None of the other factors has been proved to increase the risk of intracranial neoplasms.

- 17 Answer C. Nausea and vomiting are common in pregnancy, with symptoms usually developing between 4 and 7 weeks' gestation and resolving by 16 weeks' gestation. All of the agents listed have been used in pregnant women suffering from nausea or vomiting in early pregnancy. However, only vitamin B₆ has been demonstrated to be beneficial among those agents listed. Although vitamin B₆ has been proved to be of use in reducing symptoms of nausea, its ability to reduce vomiting related to pregnancy is less clear. More recently, ginger supplementation has been shown to reduce both nausea and vomiting related to pregnancy and may be superior to vitamin B₆. The mutagenic effects of ginger are not known but it is presumed to be safe.
- 18 Answer E. The incidence of perforation at the time of appendectomy has an inverse correlation with the age of the patient. Therefore, >90% of patients younger than 3 years have evidence of perforation in the operating room. In contrast, only 15% of adolescents have perforation at the time of appendectomy. This difference relates to the difficulty and subsequent delay in making a diagnosis in infants and toddlers. Most patients younger than 2 years have diffuse tenderness rather than focal tenderness over the right lower quadrant. Appendicoliths are considered pathognomonic for appendicitis but are only present in roughly 15% of cases. On the basis of the few studies performed to date, most authors recommend CT as superior to ultrasonography for the diagnosis of appendicitis. However, more data needs to be collected before CT is routinely recommended as the standard of care.
- 19 Answer C. The patient presents with diffuse arthralgias and fever in the setting of a recent pharyngeal infection. Rheumatic fever is the most important diagnosis to rule out in this setting. A migratory polyarthritis is common and often involves large joints. Major Jones criteria include carditis, polyarthritis, chorea, erythema marginatum, and subcutaneous nodules. Minor criteria include fever, arthralgias, and various study abnormalities. EKG is indicated to assess for the presence of conduction abnormalities, and further evaluation with echocardiogram may be necessary to evaluate for valvular abnormalities. Treatment is with anti-inflammatory agents, antibiotics, and supportive care. Discharging the patient home puts the patient at risk for valvular and conductive complications of rheumatic fever and is contraindicated. Corticosteroids are controversial. Urinalysis may be conducted in the course of evaluation to assess for the presence of poststreptococcal glomerulonephritis but does not aid the diagnosis of rheumatic fever. Lumbar puncture is not indicated in this case due to the absence of signs and symptoms of meningitis.
- 20 Answer B. Meperidine may cause serotonin syndrome in patients who are chronically taking selective serotonin reuptake inhibitors (SSRIs) or monoamine oxidase inhibitors (MAOIs). Dextromethorphan also exhibits this effect.
- 21 Answer D. Intraoral lacerations are best repaired with absorbable sutures such as vicryl. Vicryl causes less tissue reactivity than silk and is preferred over nylon because it avoids the problem of a repeat visit for removal. Large intraoral lacerations should be repaired primarily to prevent food particles from becoming entrapped and causing abscess formation and cellulitis. Small intraoral lacerations should be left to heal by secondary intention. Antibiotics (penicillin or clindamycin) may be given to patients who have through-and-through lacerations (through external skin and intraoral mucosa).
- 22 Answer D. The patient has the characteristic "wine-and-cheese" reaction due to ingestion of a tyramine-containing food with pharmacologic monoamine oxidase inhibitors (MAOI) activity. Tyramine is normally converted to endogenous stimulatory amines and monoamine oxidase (MAO) functions to break these down. Use of MAOIs inhibits this degradation function, and excess dietary tyramine in this setting causes a disorder similar to serotonin syndrome or a sympathomimetic crisis. Tyramine is present in high quantities in cheese, alcohol, dried meats and fruits, and soy.
- 23 Answer C. The patient likely has bronchiolitis, most commonly due to respiratory syncytial virus (RSV). It usually occurs during the winter months and is more severe in preterm infants. Low-grade fevers, cough, upper respiratory symptoms, and wheezing are seen commonly. Most patients do not appear toxic, but up to 10% of patients with bronchiolitis require hospitalization because of hypoxemia and severe respiratory distress. The only treatment that improves clinical status is oxygen. Bronchodilator therapy with β -agonists is controversial and not clearly proved to be effective. Corticosteroids and antibiotics are not indicated. Ribavirin is used in preterm infants or those with a history of congenital heart/lung disease. Repeated episodes of bronchiolitis as an infant may increase the risk of developing asthma later in life, but the association between the two conditions is still unclear and most patients with bronchiolitis do not go on to develop asthma.

- 24** Answer A. Anal fissures are actually the most commonly encountered anorectal problem in all of pediatrics. However, they are especially common in infants.
- 25** Answer E. Nonsteroidal anti-inflammatory drugs (NSAIDs), including aspirin, or any other members of the NSAID family may exacerbate asthma through inhibition of cyclooxygenase-1 (COX-1). In patients with aspirin-induced asthma, exposure to NSAIDs may be the only common trigger of asthma symptoms. Nonselective β -blockers cause bronchoconstriction and increase bronchial hyper-reactivity to typical asthma triggers due primarily to the disinhibition of parasympathetic pathways innervating bronchial smooth muscle. Angiotensin converting enzyme (ACE) inhibitors are generally thought to be safe in asthmatics, but there are reports of patients suffering from bronchoconstriction and bronchial hyper-reactivity when challenged with ACE inhibitors. The mechanisms for this are not completely understood and it is not clear whether there is a relation with ACE inhibitor-induced cough, which is thought to be mediated by bradykinin and substance P.
- 26** Answer D. The "crossed" straight leg raise (SLR) test is performed by raising the *unaffected* leg of a patient complaining of radicular low back pain while keeping the knee straight. The occurrence of pain radiating below the knee in the *affected* leg is nearly pathognomonic for a herniated disk with nerve root compression. Although the normal SLR test (performed on the affected leg) is more sensitive than the crossed SLR test, it has a low specificity. Therefore, many patients without true disc disease will have a positive SLR test. Pain which worsens when the ankle is dorsiflexed (Lasègue's sign) may be a helpful adjunct to the initial examination. Of note, the SLR and crossed SLR tests are considered positive only if the patient complains of radicular pain radiating down the leg past the knee. The mere presence of back pain is considered a negative test.
- 27** Answer E. There are no absolute contraindications to the use of epinephrine in anaphylaxis. Anaphylaxis can rapidly lead to cardiovascular collapse, respiratory failure, and death; so prompt recognition and treatment is necessary. Epinephrine is the only established first-line agent. Risks and benefits of treatment should be weighed in any patient, but there are no unconditional contraindications to using epinephrine in the setting of anaphylaxis.
- 28** Answer D. Noninvasive positive pressure ventilation (NIPPV) has been shown to decrease the need for endotracheal intubation, mechanical ventilation, and length of ICU stay. In addition, NIPPV has also been shown to decrease mortality in patients with acute COPD exacerbations.
- 29** Answer A. The HELLP syndrome is a severe manifestation of preeclampsia characterized by microangiopathic hemolytic anemia (*hemolysis*), elevated liver enzymes, and thrombocytopenia $<100,000/\text{mm}^3$ (low platelets). The prothrombin time (PT), partial prothrombin time (PTT) and fibrinogen levels are all normal. The disease is characterized by hepatic endothelial dysfunction resulting in platelet aggregation and consumption. However, this pathophysiology differs from disseminated intravascular coagulation in which the PT, PTT, and fibrinogen levels are abnormal. Although several different criteria for the diagnosis of HELLP have been proposed, each focuses on a low platelet count, as well as elevated levels of aspartate aminotransferase (AST) and lactate dehydrogenase (LDH).
- 30** Answer B. The presence of WBC casts indicates infection from a renal source. Other indices on urinalysis cannot distinguish between upper urinary tract infection (UTI) (pyelonephritis) and lower UTI (cystitis or urethritis). Clinically, pyelonephritis usually involves back pain and systemic symptoms of fever, nausea, vomiting, and signs of sepsis. Symptoms of uncomplicated cystitis are generally limited to dysuria, increased urinary frequency, and urgency.
- 31** Answer D. Ingestion of even small quantities of methanol is extremely lethal without appropriate therapy. One tablespoon of 40% methanol can kill an adult, and less than one teaspoon is enough to cause blindness. Methanol is metabolized to formaldehyde by alcohol dehydrogenase, and formaldehyde is converted to formic acid by aldehyde dehydrogenase. Ethylene glycol is metabolized to glycoaldehyde by alcohol dehydrogenase, and glycoaldehyde is converted to glycolic acid by aldehyde dehydrogenase. Alcohol dehydrogenase has greatest affinity for ethanol, then methanol, then ethylene glycol. GI absorption is very rapid for both ethylene glycol and methanol, usually occurring within 1 hour.
- 32** Answer E. Chest tubes should generally be placed in the third or fourth intercostal space during pregnancy and should never be placed lower than the fourth intercostal space. Because the diaphragm elevates approximately 4 cm during pregnancy, there is an increased risk of abdominal placement of chest tubes if they are placed in the typical fifth intercostal space. As in nonpregnant women, the midaxillary

line is the least muscular area of the chest wall, which makes it an ideal location for chest tube insertion. Fetal evaluation should always be delayed until maternal evaluation, treatment and stabilization, even in the setting of obvious fetal distress. (Figure reprinted with permission from Harwood-Nuss A. *The clinical practice of emergency medicine*. Lippincott Williams & Wilkins; 2005.)

33 Answer B. *Y. pestis*, the etiologic agent of bubonic plague, is a gram-negative coccobacillus which can cause a number of different clinical syndromes. In this country, it is endemic in the southwestern United States but it has gained notoriety along with anthrax and tularemia because of its potential use as a possible biologic weapon. Pneumonic plague is caused by the inhalation of infective droplets from animals or persons. Rodents are the natural hosts but pets can "bring the disease home." After an incubation period of 1 to 6 days, pneumonic plague is an aggressive disease and many patients progress rapidly to septic shock and death without early treatment. Initially, patients may complain of typical symptoms of pneumonia, and their chest x-rays frequently show alveolar infiltrates. Chest x-rays may also demonstrate an ARDS-like picture with diffuse patchy bilateral infiltrates and cavitation. None of the other agents demonstrate person-to-person transmission.

34 Answer B. The patient has a Stanford class A aortic dissection—a tear involving the ascending aorta. Management involves emergent surgical repair along with early, aggressive BP control. Patients with aortic dissection often complain of severe chest pain radiating to the back or both arms. Aspirin should not be given to any patients suspected of having an aortic dissection, as this may increase the degree of bleeding into the false lumen. Heart rate (HR) should be kept well below 100 to minimize the shear stress on the wall of the aorta that is related to the number of beats per minute. Transesophageal, not transthoracic, echocardiography may provide useful structural information about the descending aorta, heart, and pericardium, but CT aortogram and MRI are far more specific.

35 Answer D. Magnesium remains the drug of choice for the treatment of seizures in eclampsia as well as for the prophylaxis of seizures in patients with preeclampsia. The recommended dose is 6 g given intravenously over 15 to 20 minutes followed by a continuous infusion at 2 g per hour. Hydralazine, labetalol, and nimodipine are all agents that have been used for BP control in patients with eclampsia. Hydralazine is most commonly used, and is typically

given in 5 to 10 mg doses every 15 to 20 minutes. Lorazepam and phenytoin are second-line agents for seizure control in patients with eclampsia. An obstetrician should be involved in the care of all patients with eclampsia and can help direct therapy if the initial magnesium bolus is ineffective. Finally, although recommendations vary, treatment of seizures is the first priority. Once seizures are terminated, BP may be controlled only if the diastolic BP remains elevated above 105 to 110 mm Hg. In the absence of seizures, the same BP guidelines apply, and magnesium is given for prophylaxis against seizures.

36 Answer D. Erysipelas is a superficial infection of the dermis with extensive lymphatic involvement. It is characterized clinically by painful and intensely erythematous skin, which is indurated, raised, and sharply demarcated from the surrounding normal skin. It is almost always caused by group A streptococci. Though facial involvement has been classically described, 70% to 80% of infections involve the legs. Erysipelas frequently occurs in areas with poor lymphatic drainage and it frequently recurs in these areas.

37 Answer E. The patient has acute chest syndrome, as indicated by the presence of fever, cough, dyspnea, and new infiltrate on chest x-ray in the setting of sickle cell disease. It is a very common cause of death in patients with sickle cell disease. Etiologies of acute chest syndrome include bone marrow pulmonary embolism (PE), pneumonia, pulmonary thromboembolism, and intraparenchymal pulmonary infarction. Treatment involves fluids, analgesics, oxygen, and antibiotics. Heparin is used to manage pulmonary thromboembolism, but is not indicated in patients with undifferentiated acute chest syndrome. It may be indicated in patients with acute chest syndrome due to pulmonary thromboembolism, but this is evaluated on a case-by-case basis in close consultation with a hematologist. Tissue plasminogen activator may be indicated for acute stroke, MI, or severe pulmonary thromboembolism. Angioplasty is indicated for acute STEMI, but has no role in the management of acute chest syndrome. Albuterol and prednisone are used to treat bronchospastic lung disease, which is not part of the pathophysiologic process of acute chest syndrome.

38 Answer C. Keraunoparalysis typically occurs in the lower extremities and is characterized by transient paralysis associated with mottled, cool, blue, and pulseless extremities. It results from sympathetic nervous system instability and vascular spasm. These changes typically resolve without treatment within minutes to a few hours and are therefore infrequently

seen by emergency physicians in the ED. Asystole is the most common cause of death in patients struck by lightning. Although the normal automaticity of the heart may resume spontaneous activity, respiratory arrest may persist, resulting in prolonged hypoxia and the occasional development of secondary cardiac dysrhythmias such as ventricular fibrillation. Burns and myoglobinuric renal failure are uncommon in the setting of lightning strikes. "Flashover" describes the rapid movement of electrical current over the surface of the skin rather than through the patient's body. This usually results in no cardiac or pulmonary effects or cutaneous burns, although a fern-like or "arborescent" skin pattern may result.

29 Answer D. This patient has endometritis, which is the most common puerperal infection. The primary risk factor for endometritis is cesarean section, although young age, low socioeconomic status, prolonged stage 2 of labor, prolonged ruptured membranes, and multiple vaginal examinations are also risk factors. Patients typically present 2 to 3 days after delivery with fever, abdominal pain, and foul smelling lochia. Infections are polymicrobial and most commonly caused by gram-negative enteric pathogens as well as *Bacteroides* and *Prevotella* species. *Chlamydia* is rarely responsible and may cause late-onset puerpal infection.

40 Answer C. Lung abscesses are usually a consequence of aspiration of contaminated oropharyngeal flora. Therefore, the same population of patients who are at risk for aspiration are also at risk for the development of a lung abscess. Risk factors include any syndrome that results in depressed levels of consciousness and consequently increases the risk of aspiration such as alcoholism, massive stroke, head trauma, seizures, and anesthesia. Patients with poor oral hygiene are particularly susceptible because of the increased numbers of organisms among their oral flora. Still, lung abscesses develop in a scant minority of patients who aspirate contaminated oral flora. Although immunocompromised patients are also at risk, the HIV+ patient with a CD4⁺ T-cell count > 200 is unlikely to develop a lung abscess. Although drug abuse may lead to depressed levels of consciousness, IV drug use puts patients at greater risk for infectious complications related to poor skin sterilization techniques, such as endocarditis, phlebitis, or other local skin infections. It also increases the risk of pneumonia due to *S. Aureus*, which rarely causes necrotizing pneumonia. Patients with Parkinson's disease may have significant dementia, but it is primarily a motor disease that should not initially put patients at high risk for aspiration.

41 Answer C. Palpable purpura is the most sensitive finding in patients with leukocytoclastic vasculitis (also known as *hypersensitivity* or *allergic vasculitis*). The pathophysiology involves immune complex deposition in dermal postcapillary venules followed by complement activation, vessel destruction, and extravasation of red blood cells resulting in palpable purpura. Henoch-Schönlein purpura (HSP) is perhaps the most classic example of leukocytoclastic vasculitis, but other causes include mixed cryoglobulinemia, vasculitis associated with connective tissue diseases, viral hepatitis, and hairy cell leukemia. The vasculitis may also affect internal organs, as in patients with HSP and renal involvement. The other diseases listed may all produce purpura, but none of them produce palpable purpura (and Rocky Mountain spotted fever (RMSF) typically presents more of a petechial rash).

42 Answer A. Haloperidol is a potent dopamine antagonist, which does not have anticholinergic or hypotensive effects. Phenothiazines, such as prochlorperazine and chlorpromazine, cause orthostatic hypotension, lower the seizure threshold, and have strong anticholinergic properties which can exacerbate delirium. Diphenhydramine, while sedating, also shares these anticholinergic properties. Opioids may induce dysphoria and can exacerbate brain dysfunction. Diazepam has a long half-life due to its metabolites, and may result in hypotension and respiratory depression. Promethazine is primarily an antihistamine that also has strong anticholinergic properties.

43 Answer A. *P. aeruginosa* is a common nosocomial pathogen, especially in ICUs. It rarely causes infection in healthy hosts but it has an increasingly appreciated role in community-acquired infections. Most patients with *P. aeruginosa* infections have known risk factors, including patients who are mechanically ventilated, immunocompromised, HIV+, as well as patients with underlying malignancies. Among these, patients with neutropenia and those under mechanical ventilation are at highest risk. This is why empiric coverage for neutropenic fever has, in the past, included two antibiotics with activity against *Pseudomonas*. *P. aeruginosa* is also the most prominent pathogen in patients with CF. Some studies have demonstrated that as many as 97% of children with CF were colonized with *P. aeruginosa* by the age of 3. It is known that *P. aeruginosa* has a prominent role in the progression of CF, resulting in significant morbidity and mortality. However, the exact mechanisms by which it achieves this are not entirely elucidated. Ceftriaxone

and azithromycin do not provide any coverage against pseudomonas infections. Antibiotics which have antipseudomonal activity include some cephalosporins, such as ceftazidime and cefepime, β -lactam/ β -lactamase inhibitor combinations (e.g., piperacillin/tazobactam), monobactams (e.g., aztreonam), carbapenems (imipenem, meropenem), aminoglycosides, and fluoroquinolones. Resistance patterns will vary depending on the local community. *P. aeruginosa* is an important cause of malignant otitis externa, not media, in patients with diabetes.

44 Answer C. The single most common group of psychiatric disorders seen by primary care physicians is anxiety disorders. This includes simple phobia, generalized anxiety disorder, panic disorder, and obsessive-compulsive disorder. Treatment usually entails long-term selective serotonin reuptake inhibitors (SSRIs) combined with benzodiazepines, as needed for acute anxiety attacks. Mood disorders are also extremely commonly seen and treated by primary care physicians. Thought disorders such as schizophrenia are usually managed primarily by psychiatrists, as are somatoform disorders and factitious disorders. Most patients who use recreational drugs do not inform their primary care physicians about their drug use and those that do tend to be referred to addiction psychiatry specialists and outpatient rehabilitation centers. Appropriate referral from the ED for anxiety disorders and mood disorders can involve primary care follow-up exclusively. However, patients with thought, somatoform, or factitious disorders should receive dedicated psychiatric follow-up if they do not already have a preexisting therapeutic relation with a psychiatrist.

45 Answer B. Prinzmetal's (or variant) angina is characterized by chest pain caused by coronary artery vasospasm, which can result in STEMI, arrhythmia, and sudden death. Prinzmetal's can occur in concert with atherosclerotic heart disease, or may be completely unrelated. A relative reduction in nitric oxide is hypothesized to be the cause. It is often clinically and electrocardiographically indistinguishable from atherosclerotic CAD. Patients with Prinzmetal's angina can have a decrease, increase, or no change in their pain or EKG—for this reason, history of exertional angina or exercise stress testing is of limited value in diagnosing Prinzmetal's. Variant angina may be relieved by nitroglycerin. β -Blockers, like in atherosclerotic CAD, form part of the cornerstone of management.

46 Answer A. Dyspnea is the most common symptom of pulmonary embolism (PE), followed by pleuritic

chest pain. Neither symptom is sensitive or specific for the diagnosis, and a substantial proportion of patients with PE only have vague complaints such as lightheadedness, dizziness, or palpitations. Additionally, PE is commonly found at autopsy in patients who were suspected to have died of other causes. As such, it remains an underdiagnosed condition due to variability in clinical presentation. Choices C, D, and E are all seen in PE, but each occurs <50% of the time.

47 Answer B. Antiplatelet therapy with aspirin is still the most effective and cheapest medical therapy for treatment of acute MI. No other single pharmacologic agent can boast of as large a mortality reduction, including metoprolol and abciximab. Nitroglycerin and morphine do not reduce mortality in acute MI, but they are effective at managing symptoms of angina.

48 Answer B. Hydralazine, isoniazid, and procainamide may all precipitate a lupus-like syndrome. SLE typically affects the hands, wrists, and knees and is most common in young women of childbearing age.

49 Answer C. After 6 hours of warm ischemia, 10% of patients will begin to develop irreversible damage to muscles, and nerves. After 12 hours, 90% of patients will have irreversible damage.

50 Answer C. Levels of alpha fetoprotein (AFP) >500 ng per mL are present in 80% to 90% of patients with hepatocellular carcinoma (in high-incidence populations). This cutoff is used because elevated levels below 500 ng per mL may be present in patients with acute and chronic hepatitis or cirrhosis. Note that although it has been estimated that hepatitis B is responsible for 75% to 90% of hepatocellular carcinoma cases worldwide, metastatic disease is the most common cause of hepatic cancer in the United States.

51 Answer D. The treatment of choice for QRS prolongation and wide complex tachycardias in patients with tricyclic antidepressant overdose is sodium bicarbonate. Tricyclics inhibit fast sodium channel conductance and the sodium bicarbonate counteracts this effect. Stable dysrhythmias do not require immediate cardioversion. Lidocaine has no proven efficacy in patients with wide complex tachycardia due to tricyclic overdose. Procainamide (IA antidysrhythmic) and propafenone (IC antidysrhythmic) further exacerbate the inhibition of sodium channel conductance and are contraindicated.

- 52 Answer A. The image demonstrates a subarachnoid hemorrhage (SAH). Seizures may occur in up to one third of patients and may result in rebleeding, a common source of morbidity and mortality in these patients. Although the efficacy of prophylactic anticonvulsant therapy has not been rigorously tested in these patients, most authors recommend prophylactic anticonvulsant therapy in all patients with SAH. As the CT scan demonstrates blood in the subarachnoid space, there is no need for lumbar puncture. Nimodipine 60 mg, should be given orally as soon as the diagnosis of SAH is made and every 4 hours thereafter. In obtunded patients, it should be crushed and administered through an orogastric tube. Nimodipine is used to prevent vasospasm, which may result in secondary (or "delayed") cerebral ischemia. No other calcium antagonist has proved to be as effective and even the effects of nimodipine are not irrefutably positive. However, because of its safety and ease of use, it is currently recommended in all patients with aneurysmal SAH. Hypertension should be controlled in the ED with intravenous labetalol or nicardipine. Sodium nitroprusside and nitroglycerin should be avoided due to their potential to cause an increase in intracranial pressure. (Figure reprinted with permission from Haines DE. *Neuroanatomy: An atlas of structures, sections, and systems*. Lippincott Williams & Wilkins; 2003.)
- 53 Answer D. Tooth fractures are classified by the Ellis system—type I is through the enamel and the tooth appears white; type II is through the dentin and the tooth appears yellow; and type III is through the pulp and the tooth has a spot of blood which reappears when wiped away. Tooth fractures should all be followed up by a dentist—the time of follow-up varies by type. Type I requires only routine follow-up within 1 week, and types II and III require either immediate dental consultation or next day follow-up. Calcium hydroxide paste may be placed on type II and III fractures to cover the exposed dentin and pulp.
- 54 Answer E. The scaphoid is by far the most commonly broken carpal bone, usually from a fall on an outstretched hand. All other carpal bones are rarely fractured (<5% each). Both the scaphoid and the lunate are highly susceptible to avascular necrosis and all suspected cases with negative radiographs should be managed with immobilization and follow-up with an orthopedist. Most carpal bone fractures diagnosed in the ED are managed with short arm casts and take 4 to 6 weeks to heal.
- 55 Answer D. The United States has the highest rate of homicide due to firearms in the industrialized world. The ready availability of firearms in the United States combined with complex socioeconomic inequalities put urban African American youths at the highest risk for firearm-related death. The leading cause of death in this subset of the population is due to homicide from handguns.
- 56 Answer C. In the classic surgical text, "Cope's Early Diagnosis of the Acute Abdomen," Cope states that "the diagnosis of gastritis or gastroenteritis is usually made in the emergency ward by a young physician who is 'not impressed' by a patient's abdominal pain or physical findings." He goes on to write that, "the diagnosis of gastroenteritis in the emergency ward is so often incorrect as to raise a serious question whenever the emergency physician comes to this conclusion." Although this quote employs a bit of hyperbole, gastroenteritis is the most common misdiagnosis applied to cases of missed appendicitis. In contrast, many patients initially diagnosed with acute appendicitis have a normal appendix upon appendectomy. In fact, the rate of negative appendectomy has essentially remained unchanged. Among these patients, the most common diagnoses are unexplained abdominal pain (35.1%), mesenteric adenitis (22.8%), lymphoid hyperplasia (10.6%) or other diseases of the appendix (9.9%), gastroenteritis (4.4%), and ovarian cyst (3.3%).
- 57 Answer D. Trimethoprim-sulfamethoxazole is the initial drug of choice for treatment of bacterial cystitis in children. It has excellent efficacy against the common organisms implicated (gram-negative enteric bacilli) and is well tolerated. Patients with sulfa allergies should be given a penicillin derivative such as amoxicillin. Amoxicillin-clavulanic acid is a broad-spectrum agent which may be used in UTIs that are resistant to the common first-line drugs. It has the important side effect of diarrhea, which may limit compliance. Ciprofloxacin is a first-line agent for treatment of adult UTIs but concerns about musculoskeletal effects in children have prevented its use in the pediatric population. Doxycycline is contraindicated in children because it chelates calcium and permanently stains the enamel of teeth. Gentamicin is an intravenous aminoglycoside antibiotic appropriate for cases of severe pyelonephritis but is not used for outpatient treatment of either lower or upper UTI.
- 58 Answer D. The patient has an abdominal aortic aneurysm (AAA) seen on ultrasonograph. In association with hypotension and abdominal pain this must be interpreted as an acutely rupturing AAA, and the only management that will save him is surgery. Further confirmatory imaging in this scenario will

only prolong definitive management with little yield and high risk for a poor outcome. Administration of intravenous fluids, though important in resuscitation efforts pending operating room and surgeon availability, will not be able to normalize BP or prevent certain death in patients who are hypotensive with a rupturing AAA. (Figure reprinted with permission from Silverberg M. Greenberg text-atlas of emergency medicine. Lippincott Williams & Wilkins; 2004:194.)

59 Answer B. Breech presentation occurs in approximately 4% of births, or roughly 1/25 live births. Shoulder dystocia and abnormal fetal lie each occurs in roughly 1/300 live births. Face presentation occurs when the fetus is in a longitudinal lie and there is full extension of the fetal head, with the occiput against the upper back. It is associated with an increased risk of perinatal mortality (2% to 3%) and fetal anomalies (e.g., anencephaly) and it occurs in roughly 1/550 live births. Brow presentation occurs when the fetal head is inadequately flexed in a longitudinal lie, taking an intermediate position between flexion and extension. Further extension results in face presentation. Brow presentation is also associated with an increased perinatal mortality rate of 1% to 8%, and occurs in approximately 1 per 1,400 live births.

60 Answer A. The large majority of kidney stones <5 mm will pass spontaneously without the need for lithotripsy or surgical extraction. The large majority of stones >5 mm will not pass spontaneously. Urinalysis in patients with kidney stones most often shows microscopic hematuria, although 10% to 20% of cases will have completely normal urinalyses. The narrowest portion of the ureter, and one of the most common sites of obstruction, is the ureterovesicular junction at the distal-most point of the ureter. Medical management of kidney stones involves aggressive pain and nausea treatment, copious fluid intake, and stone analysis to assess for risk factors to prevent recurrence. The most common stone types are, in decreasing order of frequency, calcium, struvite, uric acid, and cystine.

61 Answer B. Although the incidence of *K. pneumonia* is higher in alcoholics than nonalcoholics, the overall most common cause of community-acquired pneumonia (CAP) in the alcoholic patient is still pneumococcus. Alcoholic patients tend to have a higher incidence of aspiration pneumonia and tuberculous disease compared with the general population. Alcohol itself is immunosuppressive and predisposes patients to a higher incidence of bacterial infections. Treatment of CAP in the alcoholic patient is similar to that of the general population—third generation

cephalosporin plus a macrolide or a fluoroquinolone. Anaerobic coverage may be added for patients who are at particular risk for aspiration pneumonia.

62 Answer B. Mallet finger is a disruption of the extensor tendon at the level of distal interphalangeal (DIP) joint with or without an associated avulsion fracture of the dorsal base of the distal phalanx. It is caused by a flexion force on the volar tip with an extended DIP joint and may commonly occur during ball sports in which the participant may describe as a *jammed* finger. Patients should be splinted in extension with either a padded aluminum splint applied to the dorsal aspect of the distal phalanx or an unpadded aluminum splint applied to its volar aspect. There is some disagreement regarding the optimal management of mallet finger when it involves a fracture. Some advocate operative repair if subluxation is present whereas other authors opt for splinting in extension for 6 to 8 weeks. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:430.)

63 Answer D. Although calcium may potentiate the effects of digoxin on the cell membrane, it is the first-line agent for the treatment of hyperkalemia resulting in a disturbance of cardiac conduction. In patients taking digoxin, 10 mL calcium gluconate should be diluted in 100 mL of 5% dextrose in water and infused over 20 to 30 minutes. The effects of calcium last from 30 to 60 minutes. Bicarbonate therapy is one of the least effective means of treating hyperkalemia, and is less effective than either albuterol or insulin. Furthermore, some authors recommend completely discontinuing its use for the treatment of hyperkalemia. Sodium polystyrene sulfate may exacerbate volume overload due to systemic absorption of sodium in exchange for removed potassium. However, the most serious complication of sodium polystyrene sulfate use is ischemic colitis and colonic necrosis, which are more common with the enema form of therapy.

64 Answer C. Aneurysms >5 cm in size are usually palpable on physical examination and approximately half the number of aneurysms between 4 and 5 cm are palpable. Audible abdominal bruits due to abdominal aortic aneurysm (AAA) are rare. Rupture of an aneurysm due to even vigorous palpation almost never occurs. Femoral pulses are usually intact in patients with AAA. Truncal obesity makes detection of AAA on physical examination much more difficult.

65 Answer C. More than 2,000 children per year die of child abuse. The most common mechanism is

head injury, followed by intra-abdominal bleeding. Evaluation and treatment of injuries from child abuse are often delayed due to the abuser's status as primary or secondary caretaker. Intracranial injuries commonly include subdural hematoma, SAH, and cerebral contusions. A vigorous shaking mechanism alone in an infant is enough to cause a fatal brain hemorrhage. The other answer choices listed are less common causes of death from child abuse. The most common overall manifestations of child abuse are soft tissue injuries, followed by long-bone fractures.

66 Answer D. Raynaud phenomenon occurs in three phases. Initially, digital pallor (white) results from total closure of the palmar and digital arteries causing a cessation in digital blood flow. When mild relaxation occurs, a trickle of blood is able to perfuse the ischemic digit but the hemoglobin is rapidly desaturated resulting in cyanosis (blue). Finally, arterial spasm resolves and restores blood flow to baseline, resulting in a reactive hyperemia (red).

67 Answer B. Meckel's diverticulum is the most common cause of substantial GI bleeding in children. The diverticulum is a remnant of the omphalomesenteric (or vitelline duct), which is frequently lined with gastric mucosa or other heterotopic tissues. It follows the "rule of 2 s." It is present in 2% of the population, and only 2% of patients will ever develop symptoms or complications from the duct. It is located within 2 feet proximal to the ileocecal valve, is 2 cm long and 2 cm wide. Half of all patients develop symptoms by the age of two. Bleeding is usually painless and often resolves spontaneously due to splanchnic vasoconstriction. A Meckel's scan which is performed with technetium Tc 99 m pertechnetate is the diagnostic test of choice.

68 Answer A. Permethrin has become the treatment of choice for scabies because it is equally efficacious to lindane, yet it is not appreciably absorbed through the skin making systemic side effects less likely. Malathion shampoo can be used for pediculosis capitis (head lice), although permethrin is still preferred because of its more pleasant odor and more rapid administration (malathion requires 8 to 10 hours of administration in cases of head lice while permethrin requires only 10 minutes).

69 Answer E. The patient likely has gonococcal conjunctivitis. The patient has signs and symptoms of pelvic inflammatory disease and urethritis and systemic antibiotic therapy is warranted. Treatment should include ceftriaxone, doxycycline or azithromycin, topical antibiotics, and saline irrigation. Admission is not absolute—however, the

presence of nausea, vomiting, or fevers generally warrants in-hospital management.

70 Answer E. Toxic alcohol ingestions often present with delayed morbidity and mortality, especially when ethanol is co-ingested. Ethylene glycol is the main toxic alcohol present in antifreeze, and its half-life without co-ingestants is up to 9 hours. In the presence of ethanol, the half-life roughly doubles. Therefore, patients who have ingested both ethanol and ethylene glycol may be asymptomatic on presentation (other than inebriation). Diagnosis involves cardiac monitoring, basic chemistry labs, ethanol level, blood gas, EKG, urinalysis, and creatine phosphokinase (CPK). Fomepizole, a pharmacologic alcohol dehydrogenase inhibitor, is administered if there is suspicion of ethylene glycol overdose, especially if an ethanol level is negative, which indicates that alcohol dehydrogenase is free to convert ethylene glycol to its toxic metabolites. Fomepizole does not detoxify the parent compound—it simply buys time for the definitive removal of the toxic alcohol by dialysis. Choices A and B are inappropriate because they fail to consider the delayed toxicity of co-ingested toxic alcohol and ethanol. Regarding choices C and D, only approximately half the number of patients with ethylene glycol poisoning develop urine crystals or urinary fluorescence on presentation.

71 Answer C. The patient has an open-book pelvis fracture in association with hypotension, which may be rapidly fatal if not treated promptly. Temporizing management revolves around reducing the effective volume into which hemorrhage can occur by tightly securing the pelvis with a commercial device or simple bedsheet. Definitive management involves angiography with embolization to control hemorrhage and surgical fixation to repair the pelvis fracture. Foley catheterization may be performed in patients with pelvic fractures if there are no hard signs of urethral trauma (e.g., blood at the urethral meatus), but priority should be given to hemorrhage control rather than evaluation of urethral trauma. CT should never be performed on the hemodynamically unstable trauma patient. Thoracotomy is not indicated in patients with blunt traumatic mechanisms as survival rates are dismally low. Additional radiographs of the pelvis should be performed after hemodynamic compromise has been addressed. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:659.)

72 Answer A. The patient has clinical evidence of cavernous sinus thrombosis, with fever, headache, and

bilateral ocular paralysis. Contrast head CT demonstrates thrombosis in the area of the cavernous sinus. Cavernous sinus thrombosis is most commonly caused by staphylococci and streptococci. Treatment involves broad-spectrum antibiotics and neurosurgical consultation for possible surgical drainage. Heparin may also be indicated in patients who have extensive thrombosis. Without treatment, mortality is close to 100%, and even with treatment it is close to 30%. (Figure from Cannon ML, Antonio BL, McCloskey JJ, et al. Pediatric cavernous sinus thrombosis complicating sinusitis. *Crit Care Med*. 2004;5(1):86-88, with permission.)

73 Answer B. The right coronary artery supplies the AV node in >80% of patients, and the left circumflex artery supplies the AV node in the rest.

74 Answer C. Many patients with head injury are at risk for posttraumatic seizures, which can worsen cerebral injury due to hypoxia. Indications for seizure prophylaxis are not absolute, but often include paralyzed or intubated patient, seizure at time of injury or in ED, penetrating or depressed skull injury, Glasgow Coma Scale (GCS) <8, subdural or epidural hematoma, and past history of seizures. Phenytoin is the first-line medication of choice to prevent posttraumatic seizures, partly because it has few negative hemodynamic effects in the trauma patient. Barbiturates are second-line agents for treatment of acute seizures after benzodiazepines because they can cause hypotension, which is detrimental in the patient with a head injury. Valproate and carbamazepine are indicated for prophylaxis of nontraumatic seizures in patients with chronic seizure disorders.

75 Answer D. Alcoholic ketoacidosis (AKA) is an elevated anion gap metabolic acidosis that usually occurs in chronic alcoholics after a recent binge of alcohol results in vomiting, starvation, dehydration, and acidosis. Owing to complex pathophysiology, the acidosis is dominated by β -hydroxybutyrate, which is not detected by standard urinary ketone tests. Furthermore, as the acidosis resolves, β -hydroxybutyrate is converted to acetoacetate and acetone resulting in a paradoxical (or false) "worsening" of the acidosis evidenced by increased detection of acetoacetate in the urine. Traditionally, the osmolal gap is normal, although there are case reports of patients with AKA and an elevated osmolal gap. It may be difficult to differentiate patients with AKA from chronic alcohol abusers with toxic alcohol ingestion. Toxic alcohol ingestion should always be in the differential of AKA and should be the top consideration whenever the osmolal gap is elevated. The alcohol level is typically

zero as AKA is primarily a starvation ketosis. Glucose levels are not usually elevated and insulin is unnecessary. Treatment is with saline and glucose solutions as well as electrolyte replacement.

76 Answer C. Audible heart murmur or fever is present in almost 90% of patients with endocarditis. Murmurs are less common and fever is more common in IV drug users. Choices A, B, D, and E occur in less than half the number of patients with endocarditis. Some type of vasculitic skin lesion will occur in most patients, but a specific type, such as Osler nodes, Janeway lesions, petechiae, or splinter hemorrhages each occur in less than one fourth of patients. Splenomegaly is present in roughly one third.

77 Answer E. Umbilical cord prolapse occurs in association with fetal malpresentation approximately 50% of the time (e.g., footling breech). However, the remaining 50% of cases occur in normal cephalic presentations. The overall incidence is roughly 1 in 160 to 1 in 600 births. Steps to arrange immediate cesarean delivery should be taken without delay. In the interim, the goal of the ED physician is to preserve umbilical circulation by relieving pressure from the umbilical cord. All of the procedures listed may be helpful in the setting of umbilical cord prolapse. If cesarean delivery is not available, the umbilical cord should be placed back into the uterus (funic reduction) and the fetus should be delivered vaginally as soon as possible. Umbilical cord entanglement is a common complication of funic reduction.

78 Answer E. Wheezes are continuous, high-pitched, musical sounds that can be heard on inspiration or expiration. They are caused by high-velocity air flow through a narrowed airway (in much the same way that a murmur is caused by high-velocity blood flow through a narrowed vessel or valve). Any pulmonary disease characterized by obstruction can result in audible wheezes on physical examination. A good, short mnemonic for obstructive airway disease is LACE:

Local airway obstruction
Asthma
Chronic Bronchitis
Emphysema

Unilateral, or localized wheezes should prompt a consideration of local airway obstruction, caused by an aspirated foreign body, endobronchial cancer, lymphadenopathy, or infection. Diffuse bilateral wheezes are generally caused by asthma or COPD. Patients with CHF exacerbations may also have diffuse wheezes caused by relative airway obstruction as

a result of airway congestion from the transudation of fluid and cellular debris from the interstitium and epithelium. However, patients with CHF usually have other historical and physical findings that help to differentiate them from pulmonary diseases. Pulmonary sarcoidosis is a *restrictive* disease that results primarily from interstitial fibrosis. Physical examination frequently reveals *dry rales*, or *fine crackles*.

79 Answer B. Chalcosis appears as golden deposits in the eye due to inflammation from copper-containing foreign bodies, leading to endophthalmitis and rapid visual loss. Choice A appears as a defect in the ring of the iris and is referred to as a *coloboma*. Choice C is known as *Seidel test*, and it indicates anterior chamber leakage, usually from trauma. Choice D is called *iridodonesis*. Choice E is called *iridodialysis*.

80 Answer D. The EKG demonstrates diffuse tall T waves consistent with hyperkalemia. The history of absence of medical care, untreated hypertension, weakness, and fatigue suggests the possibility of renal failure as the underlying cause of hyperkalemia. Potassium levels should obviously be confirmed on laboratory tests, but cardioprotective agents such as calcium chloride or calcium gluconate should be ordered early. Defibrillation should never be performed in awake patients. Cardioversion should only be performed with a clear history of hemodynamic instability. Lidocaine is used for wide complex tachycardias, but has generally been supplanted by amiodarone for acute use.

81 Answer B. The most common life-threatening emergencies in patients with chronic renal failure are volume overload and hyperkalemia. Dyspnea in the end-stage renal disease (ESRD) patient is usually secondary to fluid overload and pulmonary edema. Treatment involves standard therapy for pulmonary edema (nitrates, oxygen, diuretics, and morphine) as well as consideration for urgent hemodialysis depending on the severity of the fluid overload. MI is common in ESRD patients, but occurs less often than simple volume overload. Pneumonia may also occur, but usually causes cough, fever, or malaise in addition to dyspnea. Pulmonary embolism (PE) does not occur at an appreciably higher rate in patients who are hemodialysis dependent compared with patients with normal renal function—this is thought to be due to constant small infusions of heparin used to maintain graft patency. Diabetic ketoacidosis may occur in patients with ESRD, but usually causes the sign of tachypnea rather than a subjective sense of dyspnea. Additionally, diabetic ketoacidosis would be far less likely without a history of preexisting diabetes in a 65-year-old patient.

82 Answer B. The lifetime risk of developing MS in a patient with acute optic neuritis is 25% to 30%. Although administration of intravenous steroids reduces the duration of acute ocular symptoms, it is unclear whether it reduces the risk of development of MS. Up to half the number of patients with MS will develop optic neuritis over the course of their illness. The classic historic triad of optic neuritis is eye pain, loss of vision, and defects in color vision. White patients of northern European descent are at the highest risk demographically. Bilateral optic neuritis and recurrent optic neuritis each occur in approximately one third of patients. Recurrent disease is more common in patients who are ultimately diagnosed with MS.

83 Answer D. Because estrogens increase the renal excretion of uric acid, women have a decreased risk of developing gout until menopause. Postmenopausal women affected by gout are more often taking diuretic therapy, and often have underlying renal insufficiency. Gout is a primarily a disease of the lower extremities, although the hip joints are very rarely affected.

84 Answer D. Neglect or hemi-inattention results from an infarction of the parietal lobe in the nondominant hemisphere. In most people, the left hemisphere is the dominant hemisphere whether they are right-handed or left-handed. In left-sided lesions, a milder neglect typically results on the patient's right side.

85 Answer C. Although some patients with pontine hemorrhage may have only very small areas of involvement and only moderate symptomatology, pontine hemorrhagic stroke typically involves the entire anterior aspect of the pons, resulting in coma, miosis (pinpoint pupils), horizontal gaze palsy, and erratic breathing requiring intubation and mechanical ventilation. Miosis results from disruption of ascending sympathetic fibers that innervate the pupillary dilator apparatus. Horizontal gaze palsy results from involvement of the abducens nucleus (CN VI), which is located in the central pons. Lateral medullary syndrome is due to occlusion of the posterior inferior cerebellar artery (PICA) whereas locked-in syndrome is due to occlusion of the basilar artery. Neither syndrome involves miosis. Pseudobulbar palsy is due to the bilateral lesions of the corticobulbar tracts to lower cranial nerves and may result in dysphagia, dysarthria, and dysphonia. It spares the cranial nerves controlling the extraocular muscles (CN III, IV, and VI).

- 86** Answer D. Musculoskeletal and pulmonary etiologies combine for roughly half of all cases of pediatric chest pain. GI, cardiac, and psychogenic conditions each account for approximately 10%. Idiopathic cases comprise a large minority. Endocrine causes are rare. As in the adult, most pediatric patients with acute chest pain should have a screening chest x-ray and EKG to evaluate for pulmonary and cardiac causes, respectively. Although cardiac causes of pediatric chest pain tend to not be immediately life threatening, they often radically alter management and are not as rare as once believed.
- 87** Answer B. Anticholinergic poisoning causes a characteristic toxidrome of mydriasis, dry mucous membranes, hyperthermia, tachycardia, impaired gastric motility, urinary retention, and altered mental status. Patients who receive timely supportive care are still at risk of dying from hyperthermia, which can be difficult to control. Seizures during anticholinergic poisoning are seen more commonly in children than adults. Anticholinergics affect the skin and mucosal surfaces first, then pupils, heart, and bladder, and finally the central nervous system (CNS) and the GI systems. Sympathomimetic crises may be differentiated from anticholinergic crises with the presence of diaphoresis. The effects of anticholinergics are more pronounced on muscarinic acetylcholine receptors than nicotinic receptors.
- 88** Answer C. As a group, biliary tract malignancies are uncommon. Of this group, gallbladder carcinoma is the most common and is the fifth most common GI malignancy as it accounts for 3% to 4% of all GI tumors. Metastatic disease to the biliary tract is not common. Gallbladder carcinoma primarily occurs in the elderly, and it is more common in women than in men. Almost all patients have a history of gallstones and 20% of patients have a history of a porcelain gallbladder (calcification of the gallbladder wall). Therefore, all patients in the ED who are found to have incidental gallbladder wall calcification should be referred for elective cholecystectomy. The most common presenting symptom is right upper quadrant pain with jaundice developing later in the disease course.
- 89** Answer B. Fever and periorbital edema should prompt differentiation between periorbital and orbital cellulitis. Patients with proptosis, oculomotor dysfunction, and pain on oculomotor exercises are more likely to have orbital cellulitis. Staphylococci and streptococci are the most common causes. Diagnosis is confirmed by orbital CT scan. Treatment of orbital cellulitis is with intravenous antibiotics and possibly surgical drainage. Complications include blindness, death, and intracranial extension. Brain MRI may detect complications of orbital cellulitis but provides little advantage in the emergent evaluation. ESR is an extremely nonspecific laboratory test, which is not useful in diagnosis of most emergent conditions, except temporal arteritis, septic arthritis, and osteomyelitis. Lumbar puncture and cerebrospinal fluid (CSF) analysis are not indicated in this patient in the absence of headache or stiff neck. Slit lamp examination of the affected side is likely to be impossible given the degree of periorbital edema and not useful as a corneal or anterior chamber process is not the primary source of pathology. (Figure from Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001, with permission.)
- 90** Answer A. The patient has acute rheumatic fever, which occurs several weeks after untreated streptococcal pharyngitis. The diagnosis is made by the Jones criteria—either two major (polyarthritis, erythema marginatum, chorea, carditis, subcutaneous nodules) or one major and two minor (arthralgias, fever, increased ESR or C-reactive protein [CRP], prolonged PR interval). The patient has evidence of carditis, with a mitral regurgitation murmur and prolonged PR interval, which is the most common EKG abnormality seen. The S1-Q3-T3 morphology can occur in patients with pulmonary embolism (PE), but this finding is neither sensitive nor specific.
- 91** Answer B. Trauma patients require rapid access with large-bore peripheral IVs to optimize fluid administration. Two 14 g or 16 g IVs are ideal. Rate of fluid flow is inversely proportional to the length of the vessel and directly proportional to the radius of the vessel to the fourth power. Therefore, short, wide-bore catheters are preferred over long, narrow-bore catheters. A single IV is not adequate, given the risk of expulsion from patient movement during a trauma resuscitation. Eighteen-gauge catheters do not provide fast enough flow to keep up with severe hemorrhage. Triple lumen catheters, though generally large-bore lines, are limited in their fluid passage rates by their length, which can be up to 10 times that of a peripheral line. Intraosseous catheters provide ready vascular access in pediatric patients, but are not preferred in the adult trauma patient due to limited flow rates, difficulty of placement, and potential complications.
- 92** Answer E. All of these conditions are risk factors for delirium, but underlying dementia is the most common.

93 Answer B. Guidelines regarding the management of primary spontaneous pneumothorax continue to evolve. In the past, small pneumothoraces were defined as those pneumothoraces occupying <20% of the hemithorax. However, multiple different systems are used to estimate pneumothorax volume and analysis of plain posteroanterior (PA) chest films tends to underestimate pneumothorax volume. Recently, the British Thoracic Society published new guidelines dividing pneumothoraces into "small" and "large" categories to avoid estimations of percentages. Patients with a rim of air around the lung ≤ 2 cm are considered to have a small pneumothorax while those with ≥ 2 cm of air around the lung are considered to have a large pneumothorax. Most pneumothoraces estimated as $\leq 15\%$ have no persistent air leak and recurrence in those managed with observation alone is less than in patients treated with tube thoracostomy. Such patients do not require hospital admission, but most ED physicians observe the patient while applying supplemental O_2 (which increases the rate of resorption of the pneumothorax by a factor of 4) over a period of 3 to 6 hours after which a film is repeated to ensure there is no increase in the size of the pneumothorax. It should be stressed before discharge that these patients should return immediately in the event of developing worsening dyspnea. Any patient with hypoxia or a patient with more than minimal symptoms of dyspnea requires treatment with either aspiration and admission for observation, or tube thoracostomy and admission for observation. Patients with small pneumothoraces who fail simple observation often have secondary pneumothoraces.

94 Answer C. High-pressure injection injuries to the hand are associated with a very high rate of amputation depending on the injected substance and the rapidity of treatment. Amputation rates as high as 80% have been reported. The index finger of the nondominant hand is the most common digit involved. Entrance wounds from high-pressure injection injuries may look deceptively benign. The jet of liquid is under such high pressure that it easily penetrates the skin and gains access to the tendon sheaths causing rapid distension and an inflammatory response. Over time, compartment pressures increase, the inflammatory cascade mushrooms, and the tissues become ischemic and necrotic. The flexor sheaths of the thumb and index finger (most commonly involved) extend to the thenar space while the long, ring, and little finger sheaths extend to the midpalmar space. In addition to tetanus prophylaxis and antibiotics, a hand surgeon should be consulted immediately for emergent

wide incision and debridement to decompress the hand and eliminate inflammatory debris (e.g., paint or grease). Digital blocks are contraindicated by ED physicians due to the subsequent increase in compartment pressures.

95 Answer E. Hypocalcemia is the most common electrolyte abnormality as calcium floods the intracellular space when myocyte membranes fail. Because hyperphosphatemia may also occur, treatment of hypocalcemia is not recommended unless symptoms are severe or unless severe hyperkalemia develops. Otherwise, calcium phosphate may precipitate and form deposits in tissues. Myoglobin has a plasma half-life of only 1 to 3 hours, making detection sometimes difficult. Although myoglobinuria is pathognomonic for rhabdomyolysis, measurement of creatine kinase is the most sensitive method to detect muscle cell injury. The classic finding of a urine dipstick that is positive for blood while microscopic urinalysis reveals no red blood cells is present only 50% of the time. HMG-CoA reductase inhibitors are a well-known cause of rhabdomyolysis. In such patients, rhabdomyolysis appears to be more common in patients with preexisting renal insufficiency and in patients taking fibrates (e.g., gemfibrozil). Rhabdomyolysis only occurs in 10% of patients surviving a high-voltage electrical injury. Influenza (A and B) is the most common viral cause of rhabdomyolysis while *Legionella* is the most common bacterial cause. HIV and coxsackievirus may also cause rhabdomyolysis.

96 Answer C. Mushroom poisonings are divided into the seven major toxins responsible for the pathologic effects:

Mushroom Toxin	Pathologic Effect
Amatoxin	Hepatotoxicity
Coprine	Disulfiram-like
Gyromitrin	Seizures
Ibotenic acid	Anticholinergic
Muscarine	Cholinergic
Orellanine	Nephrotoxicity
Psilocybin	Hallucinations (drug of abuse)

97 Answer B. Patient or toxin odor may provide important clues to the toxic agent. Isopropanol is metabolized to acetone, which causes a fruity odor to the breath. Ethanol and certain hydrocarbons can also produce this finding. Cyanide smells like almonds, methyl salicylate like wintergreen, and arsenic like garlic. Acetaminophen has no particular odor, but

fulminant hepatic failure from acetaminophen toxicity may cause fetor hepaticus.

98 Answer C. The patient has fever in the presence of severe leukopenia, which implies the presence of neutropenia. Patients with neutropenic fever are at considerable risk for serious bacterial infection and require broad-spectrum antibiotics. These patients are usually admitted to the hospital for observation and bacterial culture monitoring, though carefully selected, low-risk patients may be candidates for outpatient management. Broad-spectrum antibiotics are always administered, however. Amoxicillin is usually not adequate therapy to cover pathogens commonly isolated in patients with neutropenic fever. Surgical consultation is not necessary in patients without a clear surgical cause for their fever. Intensive care is utilized for patients who demonstrate evidence of severe sepsis or septic shock and is not necessarily indicated for neutropenic fever alone.

99 Answer E. Central retinal artery occlusion (CRAO) is essentially a retinal infarction. All the chronic medical conditions listed in the preceding text as well as any condition that increases intraocular pressure predispose to CRAO. Sudden, painless loss of vision is characteristic, and a pale retina (due to decreased blood flow) with a cherry-red fovea is the classic physical examination finding. Treatment involves globe massage to increase local carbon

dioxide content which leads to vasodilation of the retinal arteries. Reduction of intraocular pressure with acetazolamide and timolol may be performed, and emergent ophthalmologic consultation should be sought.

100 Answer D. Flail chest occurs during blunt thoracic trauma when three or more ribs are each in two places, causing a discrete chest wall segment that is unattached to the rest of the chest wall. Paradoxical motion of the flail segment is characteristic: The flail segment moves inward during inspiration and outward during expiration. Severity of the flail chest injury is due to the underlying pulmonary contusion that results from the blunt trauma. Diagnosis is made by physical examination and confirmed by either chest x-ray or CT. Management is directed at treating the underlying pulmonary contusion and should first involve administration of 100% oxygen to assess for the presence of severe pulmonary shunting. If the patient does not respond to noninvasive oxygen and is persistently hypoxemic, then endotracheal intubation should be performed. Hemothorax or pneumothorax may also be present and requires tube thoracostomy. Decubitus positioning is unlikely to be helpful in treating the flail chest and may exacerbate atelectasis in the contused lung region. A heavy weight placed on the flail segment is also likely to exacerbate the pulmonary contusion with little benefit.



Test 7

Questions

- 1 Which of the following is the earliest electrocardiogram (EKG) finding in acute myocardial infarction (MI)?

(A) Hyperacute T waves
(B) ST elevation
(C) ST depression
(D) T-wave inversion
(E) Q waves

- 2 A 3-year-old girl swallows a button battery. Plain radiographs demonstrate that the battery is lodged in the esophagus. Which of the following is the most appropriate next step in management?

(A) Expectant management
(B) Endoscopic removal
(C) Ipecac for therapeutic emesis
(D) Activated charcoal
(E) Whole bowel irrigation

- 3 Which of the following routes of administration causes the fastest onset of action of cocaine?

(A) Intranasal
(B) Sublingual
(C) Oral
(D) Inhalation
(E) Transdermal

- 4 A 9-month-old infant is brought to the emergency department (ED) with a bruise on his thigh suffered from falling out of his high chair. Radiographs reveal a midshaft femur fracture. Which of the following is the most likely contributing factor?

(A) Child abuse
(B) Osteogenesis imperfecta
(C) Bone tumor
(D) Bone cyst
(E) Hypocalcemia

- 5 A 27-year-old woman at 33 weeks' gestation presenting with liver tenderness and evidence of coagulopathy is most suggestive of:

(A) Acute fatty liver of pregnancy (AFLP).
(B) Preeclampsia.
(C) Hepatitis.

(D) Cholecystitis.

(E) Intrahepatic cholestasis of pregnancy (ICP).

- 6 A 23-year-old man presents with shoulder pain after falling. A shoulder radiograph is shown in Fig. 7-1. Which of the following is the most likely additional injury?



Figure 7-1.

(A) Humeral head fracture
(B) Glenoid rim disruption
(C) Brachial artery injury
(D) Acromioclavicular (AC) separation
(E) Clavicular fracture

- 7 A 46-year-old woman presents to the ED with cough, fever, and dyspnea. Her chest x-ray is shown in Fig. 7-2. You initiate empiric treatment for community-acquired pneumonia, and perform a diagnostic thoracentesis because of the size of the effusion and her declining respiratory status. Which of the following results on pleural fluid compels you to perform urgent tube thoracostomy?

(A) pH <7.0
(B) Malignant cells

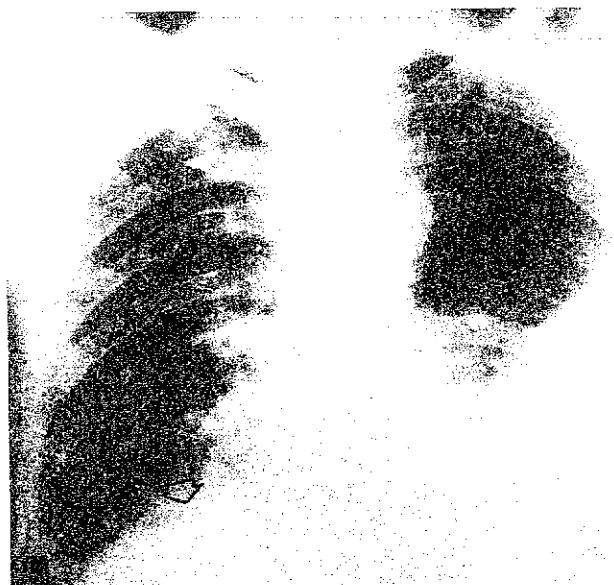


Figure 7-2.

- (C) Protein consistent with exudative effusion
 (D) Amylase elevated
 (E) Gram stain negative
- 8 The most common dysrhythmia in hypothyroid cardiovascular disease is
- (A) Atrial fibrillation.
 (B) Long QT syndrome.
 (C) Junctional escape rhythm.
 (D) Sinus rhythm with left or right bundle branch block.
 (E) Sinus bradycardia.

- 9 Primary chronic adrenal insufficiency is usually due to:
- (A) Sarcoidosis.
 (B) Hemorrhage.
 (C) Pituitary insufficiency.
 (D) Idiopathic.
 (E) Iron deposition.

- 10 A 75-year-old woman presents to the ED for evaluation of meningitis. She has had 12 hours of acute onset of headache, stiff neck, and fever. Physical examination demonstrates a febrile patient in moderate distress with nuchal rigidity and severe photophobia. A lumbar puncture is performed with the following results:

Cerebrospinal fluid	700 cells per mL, 80%
white blood cell (CSF	neutrophils, 20%
WBC):	lymphocytes.
CSF glucose:	Decreased.
CSF protein:	Elevated.
CSF Gram stain:	No organisms seen.

On the basis of these results, the presumptive diagnosis of bacterial meningitis is made. Which of the following is the most appropriate therapy?

- (A) Dexamethasone alone
 (B) Ceftriaxone alone
 (C) Vancomycin alone
 (D) Ceftriaxone and dexamethasone
 (E) Ampicillin, ceftriaxone, and dexamethasone
- 11 A 65-year-old man presents with the following asymptomatic EKG, as shown in Fig. 7-3. Which of the following is the most likely associated condition?



Figure 7-3.

- (A) Hypertriglyceridemia
- (B) Rheumatic fever
- (C) Chronic obstructive pulmonary disease (COPD)
- (D) Pulmonary embolism
- (E) Hyperkalemia

- 12** A 19-year-old woman presents with a red, painful eye for 2 days. She is a contact lens wearer. The eye is shown in white light, as seen in Fig. 7-4. Which of the following is the most likely diagnosis?

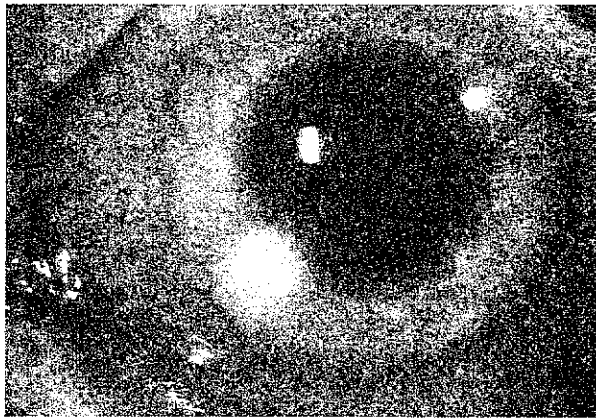


Figure 7-4.

- (A) Corneal abrasion
 - (B) Corneal ulcer
 - (C) Herpes zoster ophthalmicus
 - (D) Herpes simplex keratitis
 - (E) Hyphema
- 13** Which of the following is a risk factor for cholelithiasis?
- (A) Pregnancy
 - (B) Obesity
 - (C) Female gender
 - (D) Oral contraceptive use
 - (E) All of the above
- 14** A 22-year-old woman at 36 weeks' gestation is being treated with magnesium sulfate for preeclampsia while awaiting transfer to a nearby hospital for definitive management. Upon reevaluating the patient, you find her to be quite somnolent with markedly decreased deep tendon reflexes and a decreased respiratory rate. After managing the airway, the next best step in management is intravenous:
- (A) Dexamethasone.
 - (B) Lidocaine.
 - (C) Labetalol.
 - (D) Calcium gluconate.
 - (E) Atropine.

- 15** A 34-year-old woman presents with shoulder pain following a fall. Physical examination is normal except for tenderness in the middle of the clavicle. Radiographs demonstrate a nondisplaced clavicle fracture. Which of the following is the most appropriate course of action?

- (A) Operative repair
 - (B) Figure-of-eight brace
 - (C) Magnetic resonance imaging (MRI) to evaluate rotator cuff injury
 - (D) Shoulder sling
 - (E) Shoulder arthrocentesis
- 16** Security is called to help restrain an agitated patient in the ED. In helping to restrain the patient, one of the officers is inadvertently stuck by a contaminated needle that the nurse was using to obtain an IV. The patient is known to have chronic active hepatitis B (HepB) and the officer says he was immunized once against HepB but is a "nonresponder." Which of the following is true?
- (A) Passive immunization with hepatitis B immune globulin (HBIG) but not active immunization with the HepB vaccine should be given.
 - (B) The HepB vaccine is incompatible with typical prophylactic drug therapy for human immunodeficiency virus (HIV).
 - (C) Approximately 30% to 50% of initial nonresponders will respond to a second HepB vaccine series.
 - (D) The patient's wound should be washed with a dilute bleach solution.
 - (E) HepB is transmitted much less effectively than hepatitis C through needlestick injuries.
- 17** A 7-year-old girl presents with syncope without prodrome. EKG shows QT prolongation. Family history is most likely to reveal which of the following?
- (A) Cystic fibrosis
 - (B) Hirschsprung's disease
 - (C) Juvenile rheumatoid arthritis
 - (D) Deafness
 - (E) Short stature
- 18** Which of the following is true regarding aspirin-induced asthma (AIA)?
- (A) It accounts for half of all asthmatics.
 - (B) Children are more commonly affected than adults.
 - (C) Males are more commonly affected than females.
 - (D) It is a common precipitant of severe, life-threatening asthma.
 - (E) It is associated with Wegener's granulomatosis.

- 19 A 24-year-old woman at 35 weeks' gestation presents to your community ED after experiencing a small gush of fluid running down her leg approximately 2 hours before presentation. She has no abdominal pain, vaginal bleeding, or other complaints. Which of the following is true?

(A) A speculum and digital vaginal examination should be performed to assess the extent of cervical dilation.
 (B) Ferning is present in only 50% of patients with premature rupture of membranes (PROM).
 (C) After verification of fetal heart tones, she can be discharged with a prescription for antibiotics and prednisone with close obstetrician (OB) follow-up.
 (D) *Trichomonas vaginitis* can result in a false-positive nitrazine paper test.
 (E) All of the above.

- 20 Which of the following is the main pathologic mechanism of action of *Corynebacterium diphtheriae*?

(A) Direct cellular death
 (B) Toxin-mediated cellular death
 (C) Fungal superinfection
 (D) Protozoal superinfection
 (E) Immune suppression

- 21 Which of the following is the most common cause of encephalitis?

(A) Herpes virus
 (B) Mumps virus
 (C) Enteroviruses
 (D) *Neurocysticercosis*
 (E) Adenovirus

- 22 A 42-year-old man presents with left ear pain for 3 days. The ear is shown in Figure 7-5. Which of



Figure 7-5.

the following is the most important next step in diagnosis?

(A) X-rays
 (B) Computed tomography (CT)
 (C) MRI
 (D) Tympanocentesis
 (E) Lumbar puncture

- 23 Which of the following is true regarding anaphylaxis?

(A) Bee stings are the most common cause.
 (B) Exercise may trigger anaphylaxis.
 (C) Anaphylaxis usually occurs upon first exposure to an allergen.
 (D) Anaphylaxis is a type IV hypersensitivity reaction.
 (E) The risk of anaphylaxis is greatest in the very young and elderly.

- 24 Which of the following is the main therapeutic action of mannitol in patients with head injury?

(A) Promotes coagulation
 (B) Osmotic diuresis
 (C) Anti-inflammatory action
 (D) Seizure prevention
 (E) Renal protection

- 25 A 4-year-old girl is brought in by her mother, who is worried that "she swallowed something and it's stuck." The patient was in her usual health until this morning's breakfast, which she could not swallow and rapidly vomited. An AP chest X-ray demonstrates a coin positioned *en face* in the upper chest. The patient looks well and is otherwise asymptomatic. What is the next appropriate step?

(A) Glucagon 1 mg IV
 (B) Endoscopy
 (C) 12 ounces of soda PO
 (D) Oral papain
 (E) Heimlich maneuver

- 26 In acute MI, which of the following advantages does hirudin possess over unfractionated and low molecular weight heparins?

(A) Improved mortality
 (B) Lower incidence of major bleeding
 (C) Lower incidence of thrombocytopenia
 (D) Increased anti-X_a activity
 (E) Increased anti-XIII activity

- 27 Which of the following, when associated with the presence of an infection, comprises the most accurate definition of septic shock?

(A) Fever
 (B) Hypothermia

- (C) Hypertension
- (D) Adrenal insufficiency
- (E) Inadequate tissue perfusion

28 Which of the following vasculitis syndromes is most likely to present as pulmonary hemorrhage requiring emergent airway management?

- (A) Churg-Strauss syndrome
- (B) Polyarteritis nodosa
- (C) Wegener's granulomatosis
- (D) Goodpasture's syndrome
- (E) Mixed cryoglobulinemia

29 Shortly after intubating a 70-kg patient for severe, refractory asthma, the ventilator alarm is set off due to slightly elevated peak airway pressures. The plateau pressure is within normal limits (<30 mm Hg). Your ventilator settings are assist-control, rate 12 per minute, tidal volume 500 mL, PEEP 0 cm H_2O , and inspiratory flow rate 60 L per minute. The PO_2 is 98% to 99% with an FiO_2 of 100%. The BP is 135/80, and the pulse is 115 with sinus tachycardia on the monitor. The next best step is to:

- (A) Decrease the inspiratory flow rate in order to decrease the peak airway pressure.
- (B) Increase the tidal volume in order to decrease the peak airway pressure.
- (C) Increase the positive end-expiratory pressure (PEEP) in order to decrease the peak airway pressure.
- (D) Do nothing, the elevated peak airway pressure is unlikely to harm the patient.
- (E) Decrease the respiratory rate and increase the tidal volume to decrease the amount of auto-PEEP and thereby decrease the peak airway pressure.

30 A 26-year-old woman presents with intermittent nausea and vomiting, orthostatic lightheadedness, and mild diffuse abdominal pain. She also notes that her skin has darkened over the last month although she has been indoors. Which of the following laboratory abnormalities are you most likely to find?

- (A) Hyponatremia
- (B) Hyperglycemia
- (C) Low thyroid-stimulating hormone (TSH) levels
- (D) Hypokalemia
- (E) Elevated urinary metanephrines

31 Appropriate initial therapy in a patient with adult epiglottitis includes which of the following?

- (A) Nebulized racemic epinephrine, IV levofloxacin
- (B) Humidified oxygen, IV ceftriaxone

- (C) Nebulized racemic epinephrine, IV dexamethasone, IV ampicillin
- (D) Humidified oxygen, IV levofloxacin
- (E) IV dexamethasone, IM penicillin G benzathine

32 A 22-year-old gang member is brought to an urban ED with a gunshot wound to his arm. Primary survey of the patient is intact, but a handgun is found in the patient's clothes. Which of the following is the most appropriate action by the physician at this time?

- (A) Check to see if the gun is loaded.
- (B) Fire the gun into the floor to discharge all the ammunition.
- (C) Place the gun away from care providers and notify local law enforcement.
- (D) Hold the gun personally so no one can take it.
- (E) Use the gun to attack rival gang members in retribution.

33 A 54-year-old man presents with weakness, fatigue and decreased urinary output over the last 2 days. His laboratory results are shown in the subsequent text:

Na	145
K	4.4
Cl	100
HCO_3	22
Blood urea nitrogen (BUN)	54
Cr	2.2
Urine Na	10
Urine Cr	95

No Urine WBC, red blood cell (RBC), or casts
Which of the following is the most likely cause?

- (A) Gastroenteritis
- (B) Transitional cell carcinoma
- (C) Acute tubular necrosis
- (D) Diuretic
- (E) Benign prostatic hypertrophy

34 A rash that starts on the wrists and ankles is typical in cases of:

- (A) Meningococcemia.
- (B) Rubella (German measles).
- (C) Rubella (measles).
- (D) Henoch-Schönlein purpura (HSP).
- (E) Pityriasis rosea.

35 High-altitude pulmonary edema (HAPE):

- (A) Is the most common cause of high altitude-related death.
- (B) Causes cyanosis of the nail beds and lips.
- (C) Is typically worse at night.
- (D) May be treated in part with nifedipine.
- (E) Is all of the above.

- 36 A 4-year-old girl presents with vomiting and diarrhea. The diagnosis of acute gastroenteritis is made. Presence of which of the following findings still allows the patient to be a suitable candidate for oral rehydration therapy (ORT)?
- (A) Continued diarrhea
 - (B) Lethargy
 - (C) Shock
 - (D) Abdominal rebound
 - (E) Bowel obstruction
- 37 A 22-year-old woman presents with drug overdose in a suicide attempt. She states she took 60 of her fluoxetine tablets 2 hours before presentation. She is asymptomatic, awake, and alert, and vital signs and physical examination are normal. Which of the following is true regarding this patient?
- (A) Death from dysrhythmia is the most likely outcome.
 - (B) Ipecac is indicated to prevent gastric absorption.
 - (C) Cyproheptadine has not been proved to improve outcomes.
 - (D) Sodium bicarbonate should be used for ventricular dysrhythmias.
 - (E) Hemodialysis may be helpful in massive overdose.
- 38 The most common cause of traveler's diarrhea is
- (A) *Shigella* spp.
 - (B) *Giardia lamblia*.
 - (C) *Salmonella* spp.
 - (D) Rotavirus.
 - (E) Enterotoxigenic *Escherichia coli* (ETEC).
- 39 Which of the following is the most common cause of septic arthritis in children?
- (A) *Neisseria gonorrhoeae*
 - (B) *Streptococcus pneumoniae*
 - (C) *Staphylococcus aureus*
 - (D) *Haemophilus influenzae*
 - (E) *Streptococcus pyogenes*
- 40 A 67-year-old woman with coronary artery disease (CAD) presents with dyspnea, which is her last anginal equivalent. She is known to have a preexisting left bundle branch block. Which of the following EKG findings, when present in two contiguous leads, indicates the highest risk for acute MI?
- (A) 4 mm of discordant ST elevation
 - (B) 4 mm of concordant ST elevation
 - (C) 2 mm of ST depression
 - (D) Tall T waves
 - (E) Inverted T waves
- 41 Which of the following is the most common complication of Epstein-Barr virus pharyngitis?
- (A) Asymptomatic elevated transaminases
 - (B) Airway obstruction
 - (C) Splenic rupture
 - (D) Hemolytic anemia
 - (E) Meningoencephalitis
- 42 A 22-year-old man presents with acute onset of right scrotal pain for 2 hours. He has severe, colicky pain with nausea and vomiting, but no fevers, chills, or dysuria. Vital signs are normal, but the patient is in extreme discomfort. Abdominal examination is normal. Testicular examination reveals a tender right testis with an absent ipsilateral cremasteric reflex. Which of the following is the most appropriate next step in evaluation?
- (A) CT scan of the abdomen and pelvis
 - (B) MRI of the abdomen and pelvis
 - (C) Color Doppler ultrasonography of the scrotum
 - (D) Retrograde urethrogram
 - (E) Elicitation of the bulbocavernosus reflex
- 43 Which of the following is the most common intracranial complication of otitis media?
- (A) Meningitis
 - (B) Brain abscess
 - (C) Subdural empyema
 - (D) Lateral venous sinus thrombosis
 - (E) Focal otic encephalitis
- 44 A 22-year-old woman presents with sudden onset of palpitations. She is 10 weeks pregnant with a confirmed intrauterine fetus. Her vital signs are 98.6, 190, 20, 124/67, 98% RA. The EKG shows a regular, narrow-complex tachycardia with absent P waves. Which of the following is the most appropriate next step in management?
- (A) Digoxin 0.125 mg IV
 - (B) Adenosine 6 mg IV
 - (C) Lidocaine 100 mg IV
 - (D) Amiodarone 150 mg IV
 - (E) Procainamide 1 g IV
- 45 A 55-year-old woman presents with progressively worsening painful, swollen, and discolored left leg shown in Figure 7-6. Which of the following is the most likely pathophysiologic mechanism?

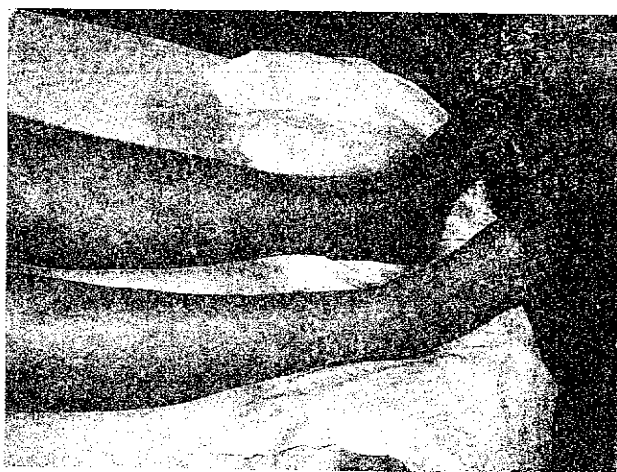


Figure 7-6.

- (A) Thrombosis
 - (B) Embolus
 - (C) Infection
 - (D) Autoimmune
 - (E) Allergy
- 46** A 4-year-old boy presents with progressive periorbital edema, weight gain, anorexia, and nausea for several weeks. Hypertension is noted on physical examination. Urinalysis demonstrates 4+ protein. Which of the following is most likely to be present in this patient?
- (A) Hyperalbuminemia
 - (B) Thrombophilia
 - (C) Hypotriglyceridemia
 - (D) Urinary bacteria
 - (E) Gross hematuria
- 47** A 29-year-old man presents to the ED with a 3-week history of diarrhea, crampy intermittent abdominal pain, and a 10-lb weight loss. He denies any bloody stools or vomiting even though his stool guaiac test is positive. He returned from a 1-month trip to India approximately 6 weeks ago and had no problems while he was there. Which of the following is the most likely cause of his symptoms?
- (A) *Shigella* spp.
 - (B) Enterotoxigenic *E. coli*
 - (C) *Enterobius vermicularis*
 - (D) *Entamoeba histolytica*
 - (E) *Campylobacter* spp.
- 48** Which of the following is a known effect of haloperidol?
- (A) Lowers the seizure threshold
 - (B) Dopamine D2-receptor antagonist
 - (C) $\alpha 1$ receptor agonist
 - (D) Histamine receptor agonist
 - (E) Agranulocytosis
- 49** A 62-year-old woman with a history of chronic atrial fibrillation presents with 2 hours of acute onset, continuous, excruciating abdominal pain. A few minutes after the onset of pain, she had a urge to defecate and had a large, forceful bowel movement. She denies bloody or melenic stool or a history of postprandial pain. On examination her abdomen is soft, flat, and only mildly tender. Labs reveal a leukocytosis of 16,000 per mm^3 with a normal chemistry. An initial flat and upright abdominal film is nonspecific and a CT scan is read by the radiologist as having evidence of small bowel thickening. What is the next most important step in management?
- (A) Interventional radiology consult for emergent angiography
 - (B) Surgical consult for emergent laparotomy
 - (C) Gastroenterology consult for emergent endoscopy
 - (D) Intravenous antibiotics and admission for presumed infectious colitis
 - (E) Admission for serial abdominal examinations without specific therapy
- 50** Which of the following constitutes definitive treatment for ethylene glycol poisoning?
- (A) Ethanol drip
 - (B) Fomepizole
 - (C) Pyridoxine
 - (D) Thiamine
 - (E) Dialysis
- 51** A 23-year-old woman presents with 2 days of fever and severe right ankle pain and swelling. She denies history of acute or chronic trauma. Past medical history is unremarkable. Physical examination reveals significant edema, effusion, tenderness, and pain on range of motion in the right ankle. Which of the following is the most likely etiology?
- (A) *S. aureus*
 - (B) *S. pneumoniae*
 - (C) *S. pyogenes*
 - (D) *Salmonella*
 - (E) *N. gonorrhoeae*

- 52 Which of the following corresponds to ischemia of the anterior circulation?
- (A) Hemiparesis and hemisensory loss of the left leg
 - (B) Transient monocular blindness
 - (C) Aphasia and hemiparesis of the right arm, leg, and face
 - (D) Ataxia, vertigo, nausea, and vomiting
 - (E) A, B, and C
- 53 Which of the following is indicated for treatment of a stable, wide complex regular tachycardia at a rate of 200 in a patient with Wolff-Parkinson-White (WPW) syndrome?
- (A) Adenosine
 - (B) Diltiazem
 - (C) Esmolol
 - (D) Digoxin
 - (E) Amiodarone
- 54 Which of the following is true about extrapulmonary tuberculosis (TB) infection?
- (A) Pericarditis is a potential manifestation.
 - (B) Painful lymphadenopathy is common.
 - (C) The central nervous system (CNS) is typically spared.
 - (D) Skeletal TB most commonly involves the pelvis.
 - (E) Adrenal TB is typically unilateral.
- 55 Which of the following is the most common complication of cirrhosis?
- (A) Encephalopathy
 - (B) Gastrointestinal (GI) bleeding
 - (C) Spontaneous bacterial peritonitis
 - (D) Ascites
 - (E) Hepatocellular carcinoma
- 56 A 52-year-old previously healthy American-born man presents 2 months after having a purified protein derivative (PPD) placed on his left forearm. He had been in Central America approximately 6 months ago with the Peace Corps. He states that the injection site became quite large, red, and firm, but he never followed up with his doctor. He now wants to know what this result means. He denies cough, weight loss, drenching night sweats, or fever. His chest x-ray is unrevealing. Which of the following is most likely true?
- (A) He has active TB and requires isolation and a multidrug treatment regimen.
 - (B) He is not infected with TB as he has no symptoms of TB.
 - (C) He has latent TB infection and he may infect other persons.
 - (D) He has latent TB infection, and requires prolonged treatment with INH and B6.
 - (E) He must be admitted for acid-fast bacilli (AFB) sputum cultures to determine if he has been infected with TB.
- 57 A 56-year-old man presents with tremor, anxiety, tachycardia, and hypertension. He has a past medical history of chronic renal insufficiency. He reports heavy alcohol use, but has not had a drink in the last 2 days. Which of the following is the most appropriate next step in management?
- (A) Haloperidol
 - (B) Lorazepam
 - (C) Chlordiazepoxide
 - (D) Diphenhydramine
 - (E) Droperidol
- 58 A 35-year-old man presents with a grade II ankle sprain. Which of the following is true regarding this patient?
- (A) The injury is minor and should heal in 3 to 5 days.
 - (B) Knee immobilization is the mainstay of management.
 - (C) Cold therapy is likely to be more beneficial than heat therapy.
 - (D) Ibuprofen is superior to acetaminophen for pain control.
 - (E) Emergent MRI is indicated to rule out grade III sprain.
- 59 Which of the following is true regarding radiographic studies and pregnancy?
- (A) The maximum amount of safe fetal radiation exposure is 10 mrad.
 - (B) Focused assessment of sonography in trauma (FAST) ultrasonography evaluation is approximately 90% sensitive in all trimesters of pregnancy.
 - (C) The cumulative background radiation exposure to a fetus throughout a 9-month gestation is greater than the exposure due to a single maternal chest x-ray.
 - (D) Lead shields minimally reduce fetal radiation exposure in the third trimester due to scatter caused by the enlarged uterus.
 - (E) The highest risk period of radiation exposure is in the first 2 weeks of pregnancy.

- 60** A 60-year-old man presents with painless hematuria. Which of the following is the most likely cause?
- (A) Renal carcinoma
 - (B) Bladder carcinoma
 - (C) Urinary tract infection (UTI)
 - (D) Glomerulonephritis
 - (E) Nephrotic syndrome
- 61** A 62-year-old man with a history of controlled hypertension presents to the ED with a fever, headache, and vomiting. He is mildly somnolent on examination and has evidence of mild neck stiffness. Suspecting meningitis as the cause of his symptoms, which of the following empiric regimens should you start?
- (A) Ceftriaxone, vancomycin
 - (B) Ceftriaxone, ampicillin
 - (C) Ceftriaxone, ampicillin, dexamethasone
 - (D) Ceftriaxone, vancomycin, ampicillin, dexamethasone
 - (E) Ceftriaxone, amphotericin, vancomycin, dexamethasone
- 62** Which of the following is the most common serious complication of pulmonary contusion?
- (A) Acute respiratory distress syndrome (ARDS)
 - (B) Pneumonia
 - (C) Pulmonary embolism
 - (D) Myocardial contusion
 - (E) Pericardial tamponade
- 63** A 37-year-old man presents with left eye pain and redness after rubbing his eye the day before. Slit lamp evaluation with fluorescein stain is shown in Fig. 7-7.



Figure 7-7.

- Which of the following is the most appropriate next step in management?
- (A) Topical antivirals
 - (B) Topical steroids
 - (C) Topical antibiotics
 - (D) Intravenous acetazolamide
 - (E) Emergent ophthalmologic consultation
- 64** Which of the following is true regarding sarcoidosis?
- (A) The incidence is higher in blacks than whites.
 - (B) Skin lesions are the most common presenting manifestation.
 - (C) Systemic symptoms such as fatigue, fever, and anorexia are uncommon.
 - (D) Arthralgias and arthritis are usually asymmetric and involve the fingers.
 - (E) The 2-year mortality rate is 65%.
- 65** A 20-year-old man presents with a painful, ulcerated lesion on his penis. He noticed it 3 days before and the pain became progressively worse. Examination shows a tender, 1-cm ulcerated lesion at the base of his penis with a single, large, tender inguinal lymph node. Gram stain of the ulcer shows gram-negative bacilli. Which of the following is the most likely cause?
- (A) Herpes simplex virus
 - (B) *Chlamydia trachomatis*
 - (C) *Staphylococcus epidermidis*
 - (D) *Haemophilus ducreyi*
 - (E) *Treponema pallidum*
- 66** Which of the following has the highest sensitivity for ruling out testicular torsion?
- (A) Normal cremasteric reflex
 - (B) Presence of Prehn's sign
 - (C) Normal urinalysis
 - (D) Absence of fever
 - (E) Absence of vomiting
- 67** A 4-day-old neonate is brought in by her mother for irritability, excessive shaking and tremulousness, and an abnormal cry. The infant's glucose level is 20. Which of the following is the best initial treatment of this infant?
- (A) 0.03 mg per kg of glucagon delivered IV
 - (B) 2 to 4 mL per kg of D10
 - (C) 1 to 2 mL per kg of D25
 - (D) 1 amp of D50 given IV
 - (E) Octreotide infusion

- 68 A 64-year-old woman presents with paresthesias in her hands and feet for the last few weeks. She is concerned that she has diabetes. She denies any past medical history. Physical examination reveals decreased vibratory sensation and proprioception in her hands and feet. Laboratory data demonstrates a normal glucose and macrocytic anemia. Which of the following is most likely to be present on further patient history?
- (A) Smoking history
 - (B) Chronic aspirin use
 - (C) Strict vegetarian diet
 - (D) Chronic melena
 - (E) Family history of thalassemia
- 69 Which of the following is true regarding epidural hematomas?
- (A) Even with early diagnosis and aggressive therapy, mortality is approximately 100%.
 - (B) The "lucid interval" is pathognomonic.
 - (C) The temporal area is the most common region affected.
 - (D) Concave shape on CT scan is classic.
 - (E) Patients are asymptomatic in 50% of cases.
- 70 Which of the following traumatic mechanisms is the best candidate for ED thoracotomy?
- (A) Blunt trauma to the chest
 - (B) Blunt trauma to the abdomen
 - (C) Blunt trauma to the pelvis
 - (D) Penetrating trauma to the chest
 - (E) Penetrating trauma to the abdomen
- 71 Which of the following is the most serious complication seen with four-part fractures of the humeral head?
- (A) Associated olecranon fracture
 - (B) Adhesive capsulitis
 - (C) Pneumothorax
 - (D) Associated scapular fracture
 - (E) Avascular necrosis
- 72 Which of the following is the most sensitive indicator of high-altitude cerebral edema (HACE)?
- (A) Cerebellar ataxia
 - (B) Vomiting
 - (C) Abducens nerve palsy
 - (D) Seizures
 - (E) Slurred speech
- 73 Typical nitroprusside urine dipstick analysis primarily detects which of the following ketones?
- (A) Acetoacetate
 - (B) Acetone
 - (C) β -hydroxybutyrate
 - (D) Oxalate
 - (E) None of the above
- 74 Which of the following is true about the diagnosis of acute appendicitis?
- (A) CT scanning may be less sensitive in thin patients and children.
 - (B) The most sensitive CT study involves thin-cut helical CT with rectal contrast.
 - (C) CT scanning in patients with early symptoms of appendicitis has a lower sensitivity.
 - (D) Negative ultrasonography examinations should be followed by a CT scan or in-patient observation.
 - (E) All of the above.
- 75 A 30-year-old woman presents with painless hematuria. Which of the following is the most likely cause?
- (A) Renal carcinoma
 - (B) Bladder carcinoma
 - (C) UTI
 - (D) Glomerulonephritis
 - (E) Nephrotic syndrome
- 76 Which of the following is true regarding scapular fracture?
- (A) Associated thoracic injury is usually more serious than the fracture itself.
 - (B) Operative repair is usually required.
 - (C) Penetrating trauma to the back is the most common mechanism.
 - (D) The arm is usually held in full abduction.
 - (E) Associated contralateral scapular fracture is common.
- 77 A 55-year-old man without any past medical history presents with chest pain. Physical examination is normal. The EKG is shown in Figure 7-8. Which of the following represents the likely site of pathology?
- (A) Pericardium
 - (B) Pulmonary artery
 - (C) Left circumflex artery
 - (D) Left anterior descending (LAD) artery
 - (E) Right coronary artery



Figure 7-8. (See color insert.)

- 78** A 6-month-old infant falls out of her high chair onto the kitchen floor and is brought by her parents for evaluation. The parents note that there was no definite loss of consciousness (LOC), vomiting, or seizure activity. She has not been abnormally sleepy, but her parents note that she should be hungry at this time and has been refusing feeds. Her physical examination, including neurologic examination, is unremarkable. Which of the following is the most appropriate next step in management?
- Contact Department of Children and Family Services (DCFS)
 - Skull x-rays
 - CT brain
 - MRI brain
 - Discharge home
- 79** Risk factors for decompression sickness (DCS) include which of the following?
- Patent foramen ovale
 - Obesity
 - Cold ambient temperature after diving
 - Dehydration
 - All of the above
- 80** Which of the following is true regarding patients with sternal fractures?
- Coexisting aortic injury occurs in half of cases.
 - Mortality is close to 50% even in isolated cases of sternal fracture.
 - Lateral chest radiography is diagnostic.
 - Spinal fracture is the most common associated bony injury.
 - Unrestrained passengers are at higher risk than restrained passengers.
- 81** Parents of a 3-year-old boy bring him to the ED with a yellowish, crusting facial rash, as shown in Fig. 7-9. Which of the following is true?



Figure 7-9. (See color insert.)

- (A) The lesions are not easily transmitted to other patients.
- (B) Most cases are caused by group A *Streptococcus*.
- (C) Antibiotic therapy reduces the incidence of poststreptococcal glomerulonephritis.
- (D) Regional lymphadenopathy is a common finding.
- (E) The lesions are typically painful.

82 Which of the following is the most common organ affected by *Francisella tularensis*?

- (A) Skin
- (B) Liver
- (C) Kidney
- (D) Heart
- (E) Lungs

83 A 28-year-old man with a history of asthma is brought to the resuscitation room in your ED with a chief complaint of wheezing, dyspnea, and cough. Your ED has an asthma "protocol" in which all severe asthmatics receive an immediate portable chest x-ray. Which of the following is true of chest x-rays in asthma?

- (A) All asthmatics who present to the ED with wheezing should received a chest x-ray.
- (B) Chest x-rays reveal an infiltrate in 50% of patients experiencing an asthma exacerbation.
- (C) Approximately 50% of patients not responding to optimal therapy have unsuspected pulmonary complications evident on chest x-ray.
- (D) Chest x-rays are most useful to detect the pulmonary complications of asthma exacerbations.
- (E) Chest x-rays should only be used if an asthma patient is febrile, with symptoms suggestive of pneumonia.

84 A 26-year-old man is brought to the ED after a motor vehicle accident. He was the restrained passenger in a jeep traveling 45 mph when the driver lost control and struck a tree. The patient's left knee struck the dashboard and he is now complaining of pain in his left knee and hip. Which of the following is the most likely diagnosis (see Fig. 7-10)?

- (A) Femoral neck fracture
- (B) Open book pelvis fracture
- (C) Ischial tuberosity fracture
- (D) Posterior hip dislocation
- (E) Greater trochanter fracture

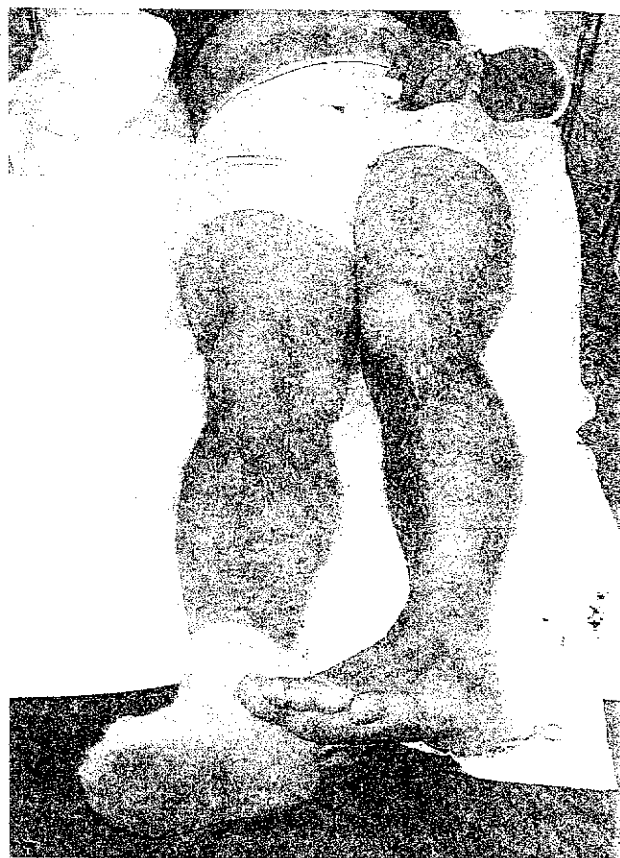


Figure 7-10.

85 Which of the following leads to the most severe acute ocular injury?

- (A) Acid
- (B) Alkali
- (C) Ultraviolet light
- (D) Hand soap
- (E) Cigarette ashes

86 A 42-year-old previously healthy man develops headache, dizziness, decreased responsiveness, right-sided hemiplegia, and aphasia within a minute of emerging from the water after diving to a shipwreck with friends. The most likely cause of his symptoms is

- (A) Arterial gas embolism (AGE).
- (B) Nitrogen narcosis.
- (C) Decompression sickness (DCS).
- (D) Contaminated air exposure.
- (E) Alternobaric vertigo.

87 A 24-year-old woman presents with bilateral eye redness and pain on waking. She states that her eyes are extremely watery and irritated, but denies

purulent discharge. She states her roommate had the same symptoms a few days ago. She does not wear contact lenses. Her visual acuities are normal. Physical examination demonstrates bilateral conjunctival injection without discharge. Slit lamp examination is unremarkable. Which of the following is the most likely etiology?

- (A) Herpes simplex virus type 1 (HSV-1)
- (B) Varicella-zoster virus (VZV)
- (C) Adenovirus
- (D) *S. pneumoniae*
- (E) *Pseudomonas aeruginosa*

88 Cold allodynia, the sensation of pain or dysesthesia when coming into contact with cool or cold objects (often called *cold reversal*) is virtually pathognomonic for which of the following causes of acute food poisoning?

- (A) Scombroid
- (B) Shigellosis
- (C) *Clostridium perfringens*
- (D) Ciguatera
- (E) *Bacillus anthracis*

89 A 57-year-old man with hypertension, hypercholesterolemia, peripheral vascular disease, and smoking history presents with inability to walk due to pain. He has had progressive worsening of pain in both his legs on walking for several weeks, and the left calf has been extremely painful for 2 days. Vital signs are: T 98.2, HR 90 regular, BP 175/90, RR 20, SpO₂ 98% RA. Examination reveals a regular heart rate, 1+ DP/PT pulses on the right, absent DP/PT pulses on left, ABI 0.55 on the right, and 0.40 on the left, no bruits, and no signs of infection. Which of the following is the most likely pathophysiologic mechanism?

- (A) *In situ* thrombosis
- (B) Arterial embolism
- (C) Inflammation
- (D) Vasospasm
- (E) Arteriovenous (AV) fistula

90 Oropharyngeal dysphagia:

- (A) Results in more difficulty swallowing solids than liquids.
- (B) Is a common result of stroke.
- (C) Is almost never associated with myasthenia gravis.
- (D) Is characterized by progressive, unremitting dysphagia.

(E) Commonly presents with neck pain and torticollis.

91 A patient in your ED refuses to take penicillin because she is "allergic." The historical feature most suggestive of a true allergy in this patient is

- (A) Paresthesias.
- (B) Vomiting.
- (C) Fatigue.
- (D) Urticaria.
- (E) Palpitations.

92 Which of the following is true regarding brown recluse spiders?

- (A) Most bites require no treatment and resolve without complications.
- (B) Hemorrhagic lesions require urgent dermatologic consultation for excision.
- (C) Dapsone is used to prevent secondary bacterial infection of brown recluse bites.
- (D) Topical steroids decrease the severity of the tissue reaction.
- (E) Aspirin should be used to decrease platelet aggregation and thrombosis.

93 A 24-year-old woman presents to the ED with left facial pain. She had been diagnosed with right-sided trigeminal neuralgia 1 year ago and was started on carbamazepine. Although her symptoms resolved over several weeks, she is now complaining of similar symptoms on the right side of her face. In addition, she notes a history of mild right arm weakness and numbness several months ago that seems to have resolved without any intervention. Which of the following should be considered in this patient?

- (A) Lyme disease
- (B) Multiple sclerosis (MS)
- (C) Guillain-Barre syndrome
- (D) Myasthenia gravis (MG)
- (E) Cerebellopontine angle tumor

94 A 25-year-old man presents after a motor vehicle collision. Primary survey is intact and vital signs are normal. Genitourinary examination is shown in Figure 7-11. Which of the following is the most appropriate next step in management?

- (A) Foley catheter placement
- (B) Retrograde urethrogram
- (C) Retrograde cystogram
- (D) Urinalysis
- (E) Aspiration of the corpora cavernosa



Figure 7-11.

95 Which of the following statements about foreign body aspiration in the elderly is correct?

- (A) Asphyxia due to foreign body aspiration is easily recognized by emergency medicine personnel.
- (B) Asphyxia is not possible from aspiration of semisolid foods such as mashed fruit or puree.
- (C) Most symptomatic aspirations in elderly patients are located in the supraglottic region.
- (D) The best initial treatment of suspected aspiration in an elderly person is the application of multiple back blows.
- (E) Poor dentition is not a factor in foreign body aspiration.

96 In a patient with a systolic blood pressure of 90 mm Hg after blunt abdominal trauma, the pictured finding on FAST examination, as shown in Fig. 7-12:

- (A) Is an indication for exploratory laparotomy.
- (B) Indicates that at least 2.5 L of blood is present in the peritoneum.
- (C) Indicates a liver laceration is present.
- (D) Should be followed by a CT scan to elucidate the injury.
- (E) Shows all of the above are true.

97 The most common cause of epidural spinal cord compression is

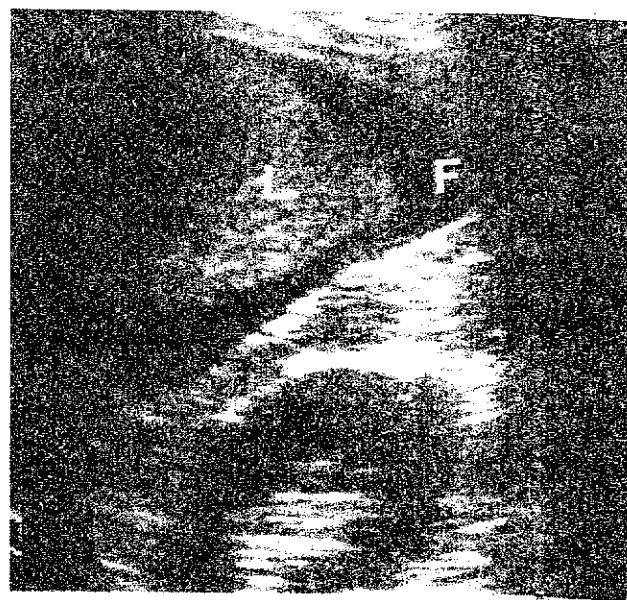


Figure 7-12.

- (A) Epidural abscess.
- (B) Myelitis.
- (C) Central disk herniation.
- (D) Metastatic disease.
- (E) Epidural hematoma.

98 A 22-year-old woman presents with a gunshot wound to the left chest. Chest X-ray is shown in Figure 7-13. Which of the following is the most likely diagnosis?

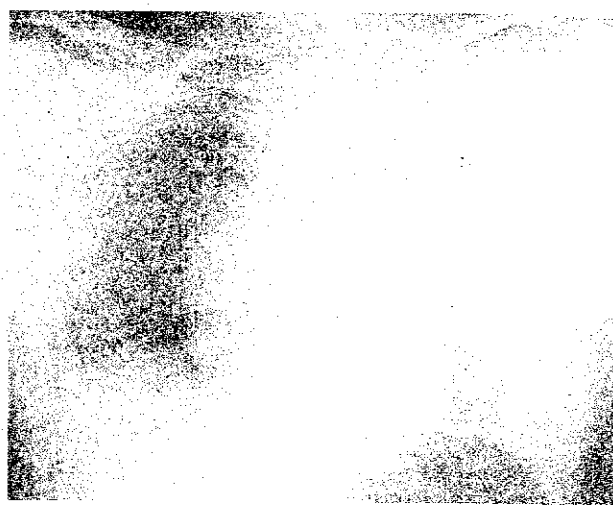


Figure 7-13.

- (A) Pneumothorax
- (B) Pericardial tamponade
- (C) Hemothorax
- (D) Pneumoperitoneum
- (E) Diaphragmatic rupture

- 99 Which of the following is true regarding EKGs in posterior wall myocardial infarction (MI)?
- (A) Abnormalities are most commonly seen in V3.
 - (B) ST elevations in precordial leads are diagnostic.
 - (C) Tall R waves are the earliest findings.
 - (D) T-wave inversions are common in V1-V3.

- (E) Posteriorly placed leads are more accurate than anterior leads.

- 100 Which of the following is the most common relationship of the caregiver to the victim of Munchausen's syndrome by proxy?

- (A) Biological father
- (B) Step-father
- (C) Biological mother
- (D) Step-mother
- (E) Nonparent guardian

Answers and Explanations

- 1 Answer A. The temporal sequence of EKG morphologies in acute MI is generally hyperacute T waves, ST elevation, T-wave inversion, and Q waves. Hyperacute T waves may also be seen in hyperkalemia, and (along with ST elevation) in benign early repolarization, acute pericarditis, and left ventricular hypertrophy (LVH). ST elevation may also be seen in bundle branch block and ventricular aneurysms. The evolution in the preceding sequence in the appropriate clinical setting usually points to ST-elevation myocardial infarction (STEMI). This is a strong argument for performing repeated EKGs in the evaluation of acute coronary syndrome in the ED.
- 2 Answer B. Button batteries lodged in the esophagus or trachea can cause obstruction, necrosis, and perforation. Esophageal button batteries should be removed urgently with upper endoscopy. Any button battery distal to the esophagus may be managed expectantly and will likely pass without any specific treatment. Ipecac is rarely indicated for any ingestion anymore. Activated charcoal is not indicated for foreign body ingestions. Whole bowel irrigation may be useful to help speed passage of a postesophageal button battery that has been slow to progress with expectant management alone.
- 3 Answer D. Cocaine may be taken in a variety of routes, most commonly intranasal and inhalational (crack). Inhalational and intravenous use causes the quickest onset of action, followed by intranasal, and then oral. The duration of action is longest in oral, followed by intranasal, then intravenous/inhalational. The transdermal route is not used for cocaine abuse.
- 4 Answer A. Fractures are found in most abused children. Although no fracture is 100% specific for child abuse, several types are extremely high risk—any fractures in infants (especially of the femur) and spiral, multiple, rib, metaphyseal, humerus, and scapula fractures. Complete skeletal surveys are indicated for patients younger than 5 years who are suspected of being abused. Osteogenesis imperfecta is a rare disease, which causes problems in bone synthesis due to collagen defects. Frequent fractures are common and physical examination may demonstrate blue sclerae, deafness, and ligamentous laxity. Subclinical cases may be more common than previously recognized. Bone tumors and cysts and hypocalcemia may predispose to fracture but are not as likely to cause femoral fractures in the infant as child abuse.
- 5 Answer B. The HELLP syndrome is a severe manifestation of preeclampsia characterized by hemolysis, elevated liver enzymes, and low platelets. However, liver function tests are abnormal in 20% to 30% of patients overall, and is not limited to patients with HELLP syndrome. Acute fatty liver of pregnancy (AFLP) is an exceedingly rare disorder (at least ten times less common than HELLP syndrome) that occurs during the third trimester. It is heralded by the presence of nausea and vomiting in the third trimester with associated epigastric pain and liver dysfunction. In contrast to the HELLP syndrome, coagulation abnormalities, including an elevated prothrombin time (PT) are present early in the disease course. Hepatitis is the most common cause of liver disease in pregnancy. As in nonpregnant women, however, most patients experience a subclinical illness and do not report any symptoms. Symptomatic patients present with jaundice or scleral icterus, nausea and vomiting, and right upper quadrant tenderness with aminotransferase levels in the thousands. The course in pregnant and nonpregnant women is typically benign and indistinguishable from one another. Cholecystitis is the second most common surgical emergency during pregnancy and patients typically present with fever, right upper quadrant pain, nausea and vomiting, and leukocytosis (although this can be confused with the leukocytosis of pregnancy). Intrahepatic cholestasis of pregnancy (ICP) is, like AFLP, a rare disorder that typically complicates the third trimester. Patients present with moderate to severe pruritus that typically begins on the palms and soles and progresses in an ascending manner. Approximately 20% of patients will also be jaundiced on presentation. ICP is associated with increased preterm delivery, increased perinatal mortality, and meconium staining. Fetal mortality approaches 20% in untreated patients. The optimal treatment for preeclampsia, AFLP, and ICP is delivery.
- 6 Answer A. The radiograph demonstrates an anterior shoulder dislocation, with the humeral head displaced anteriorly relative to the glenoid. Common complications include (in order of decreasing frequency) axillary nerve injury (causing deltoid anesthesia), humeral head fracture (Hillman-Sachs deformity), and glenoid rim disruption (Bankart lesion). Vascular compromise in shoulder dislocations is rare. Acromioclavicular (AC) separation and clavicular fractures are rarely associated with shoulder

dislocations because of different mechanisms. The mechanism of an anterior dislocation is trauma to the abducted and externally rotated upper extremity. Clavicle fractures and AC separations tend to occur with trauma to the adducted arm. (Figure courtesy of Shoma Desai, MD. Reprinted with permission from Desai S. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:497.)

7 Answer A. Complicated parapneumonic effusion and empyema are rare, but severe complications of pneumonia are associated with a mortality rate of 15% to 20%. Although diagnostic thoracentesis is a procedure that is rarely performed in the ED, it is necessary to diagnose life-threatening conditions such as emphysema as soon as possible. Approximately 60% of patients with pneumonia develop some amount of pleural fluid, but most of these patients have a simple parapneumonic effusion. The characteristics of pleural fluid in the setting of pneumonia determine whether the effusion is simple, complicated, or if frank pus is present, an empyema. These three distinct categories of disease represent the typical progression of disease in patients with parapneumonic effusions. Pleural fluid pH, lactate dehydrogenase (LDH), glucose, and Gram stain determine into which category the effusion is classified. Simple parapneumonic effusions are clear, with a pH >7.2, LDH <1,000, glucose >40 mg per mL, and a negative Gram stain. Conversely, complicated parapneumonic effusions may be turbid, have a pH <7.2, LDH >1,000 (reflecting more severe inflammation), glucose <40 mg per mL and may have a positive Gram stain. A pH <7.0 is typically found only in the setting of frank pus in the pleural space, called *empyema*. Indications for tube thoracostomy include a pH <7.2 (i.e., a complicated parapneumonic effusion), a positive Gram stain, or the presence of frank pus in the pleural space. Infected parapneumonic effusions must be drained as soon as possible to prevent the development of subsequent adhesive disease resulting in significant loculations and scar tissue. A chest surgeon should be consulted anytime a chest tube is inserted for empyema or complex parapneumonic effusion, because surgery may ultimately be necessary to ensure adequate drainage. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:444.)

8 Answer E. The most common dysrhythmia in hypothyroid cardiac disease is sinus bradycardia. Cardiomegaly and depressed cardiac contractility are other manifestations.

9 Answer D. Increasingly, acute adrenal insufficiency is thought to be a rare condition, and most cases of acute adrenal insufficiency probably represent an exacerbation of chronic disease. When acute adrenal insufficiency occurs, it is most commonly due to exogenous glucocorticoid administration. Chronic adrenal insufficiency is idiopathic (thought to be autoimmune-mediated destruction of the adrenal gland) in 66% to 75% of cases.

10 Answer E. The treatment of bacterial meningitis varies by age of the patient. All patients should be treated with a third-generation cephalosporin to cover meningococcus, pneumococcus, and gram-negative bacilli. At the extremes of age, *Listeria monocytogenes* is a more common pathogen and should be specifically treated with either ampicillin or trimethoprim-sulfamethoxazole. Vancomycin may be used in addition to these therapies to cover methicillin-resistant *S. aureus* in endemic areas. Dexamethasone should be given before or simultaneously with the first dose of antibiotics.

Answer C. The EKG demonstrates multifocal atrial tachycardia (MAT), which is associated most commonly with COPD, followed by congestive heart failure (CHF), hypokalemia, and hypomagnesemia. There are P waves of at least three different morphologies associated with an irregular tachycardia. Management involves treatment of the underlying condition. Patients with MAT rarely have hemodynamic compromise as a result of their dysrhythmia. (Figure from Fowler NO. *Clinical electrocardiographic diagnosis: A problem-based approach*. Philadelphia: Lippincott Williams & Wilkins; 2000, with permission.)

Answer B. The patient has a lesion at 7 o'clock indicative of a corneal ulcer. In a contact lens wearer, *Pseudomonas* is a potentially devastating cause and should be treated aggressively with topical and/or systemic antibiotics and emergent ophthalmologic consultation. Further contact lens use is contraindicated until approved by the ophthalmologist. A corneal abrasion appears as a greenish patch on fluorescein staining under cobalt blue light. Herpes zoster ophthalmicus is suggested by the presence of facial skin lesions with pseudodendrites on slit lamp examination. Herpes simplex keratitis is diagnosed when dendrites are seen on slit lamp examination. Hypyema (blood layering at the bottom of the anterior chamber) is not evident here. (Figure from Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001, with permission.)

- 13 Answer E. The risk for cholelithiasis is two- to threefold higher in women than in men through the fifth decade, after which time, the risk is roughly equal. This is thought to be related to estrogen secretion. Other risk factors include estrogen use (either in oral contraceptives or as isolated estrogen therapy), age (because gallstones rarely dissolve spontaneously, their prevalence increases with age), pregnancy (probably due to estrogen), obesity, and rapid weight loss.
- 14 Answer D. Calcium gluconate antagonizes the effect of magnesium and should be given immediately in all patients with any sign of respiratory depression. The magnesium infusion is discontinued, and 1 g of calcium gluconate is infused over 2 to 3 minutes.
- 15 Answer D. Clavicular fracture is extremely common with shoulder trauma. The vast majority of clavicular fractures are treated conservatively with shoulder sling and orthopedic follow-up. Operative repair is almost never indicated in nondisplaced, closed fractures, because conservative management results in excellent functional outcomes. There is no proven advantage of the figure-of-eight brace over simple sling, and it may actually cause skin necrosis if applied too tightly. Emergent MRI is almost never indicated in acute injuries, and clavicle fracture with concomitant rotator cuff injury is rare. Shoulder arthrocentesis is indicated only in cases of suspected septic arthritis and has little role in acute trauma.
- 16 Answer C. HepB is very effectively transmitted through percutaneous needlestick exposure, even though the rate of transmission depends on the presence of the "e" antigen (hepatitis B e antigen [HBeAg]) indicating higher infectivity. Health care providers exposed to HBeAg-positive needlesticks develop clinical evidence of hepatitis in approximately 33% of cases and serologic evidence in up to 62%. In contrast, exposure to HBeAg-negative patients results in clinical hepatitis in only 1% to 6% of cases and serologic evidence in up to 37%. In contrast, exposure to a hepatitis C-positive source results in an infection rate of roughly 1.8% (0%-7%). All patients who have not received the HepB vaccine as well as patients who were vaccinated with a single series but who failed to respond should receive both the HBIG and the HepB vaccine series. The HepB vaccine should always be given in the deltoid muscle with a needle 1 to 1.5 in. long (apparently better response rates have resulted from deltoid injection). There is no evidence that using antiseptics for wound care or expressing fluid by squeezing

the wound further reduces the risk of bloodborne pathogen transmission.

- 17 Answer D. Prolongation of the QT interval may be due to congenital or acquired causes. Congenital long QT syndromes may be associated with deafness (Jervell-Lange-Nielsen syndrome), or without deafness (Romano-Ward syndrome). Acquired causes can be from electrolyte abnormalities, environmental conditions, or medication effects. Excessive prolongation can result in potentially fatal ventricular dysrhythmias, such as ventricular fibrillation and *torsade de pointes*. Treatment is usually with magnesium and standard advanced cardiac life support (ACLS) protocols. Prevention of ventricular dysrhythmias is with chronic β -blocker therapy and sometimes pacemakers/defibrillators.
- 18 Answer D. Although there is variability in the reported incidence of aspirin-induced asthma (AIA), recent studies estimate that its incidence is 3% to 5% in asthmatics. Overall, it accounts for 10% to 15% of asthmatics. The actual prevalence is likely a bit higher because many asthmatics fail to recognize mild aspirin-related symptoms or purposely avoid aspirin-containing products after becoming aware of potentially adverse complications without conveying this to their physicians. Diagnosis is made through aspirin-provocation tests after patients present with asthmatic symptoms associated with aspirin use. It is far more common in adult asthmatics than in children with asthma, and is more common in women than men. After ingesting acetylsalicylic acid (ASA) or nonsteroidal anti-inflammatory drugs (NSAIDs), asthmatics may experience an acute exacerbation of symptoms within 3 hours that is frequently accompanied by profuse rhinorrhea, conjunctival injection, periorbital edema, and occasionally facial flushing. Unfortunately, bronchoconstriction may be severe and life threatening, requiring mechanical ventilation. Compared with all patients presenting with asthma exacerbations, aspirin-induced asthmatics more frequently require intubation and mechanical ventilation. Wegener's granulomatosis is an antineutrophil cytoplasmic antibody (ANCA)-associated small vessel vasculitis that most commonly affects the lungs and kidneys, but is not associated with AIA.
- 19 Answer D. This patient experienced *preterm* premature rupture of membranes (PPROM), defined as premature rupture of membranes that occurs before 37 weeks' gestation. PROM is defined as rupture of fetal membranes before the onset of labor and occurs in approximately 8% of pregnancies. The first step in the evaluation of any pregnant woman with

a history of a "gush of fluid" or a "sensation of wetness" is verification that the fetal membranes have ruptured. A sterile speculum examination should be performed on all women to collect fluid for further testing. In contrast, a digital examination should not be performed until a diagnosis of PROM is excluded or until labor has begun and delivery is expected within 24 hours. Digital examinations increase the risk of chorioamnionitis as well as neonatal sepsis and mortality. Although pooled fluid in the posterior fornix is suggestive of PROM, the presence of ferning (arborization pattern of dried amniotic fluid when allowed to air dry on a microscope slide) and a positive nitrazine test (blue or blue-green color of nitrazine paper upon exposure to the fluid) are diagnostic. Both ferning and the nitrazine test have sensitivities >90%. However, the presence of blood, semen, excessive cervical mucus and *Trichomonas vaginitis* can cause false-positive nitrazine tests because each of these entities raises the vaginal pH. The normal vaginal pH during pregnancy is 3.5 to 6.0, although the pH of amniotic fluid is 7.1 to 7.3, which causes nitrazine paper to turn a blue color. In addition, cervical mucus also causes a ferning pattern, but it tends to be more floral in appearance and lacks the branches of amniotic fluid ferning. Once a diagnosis of PROM is confirmed, all such patients should be transferred to a tertiary care facility for further management. Although management techniques vary, there is broad agreement that all patients with PROM should receive intravenous antibiotics to prevent chorioamnionitis and neonatal sepsis. Most authors recommend prompt delivery rather than conservative attempts to prolong gestation once the fetus has reached 34 to 36 weeks of age.

- 20** Answer B. *C. diphtheriae* is a gram-positive bacillus, which exerts its pathologic effects through an exotoxin. The bacterium initially affects the pharynx, where the exotoxin kills cells directly and forms a membrane. The exotoxin then spreads to other tissues and causes neurologic and cardiac dysfunction, including paralysis of the pharyngeal muscles and myocarditis. Although most Americans are immunized as children, a substantial portion of the population is not. Patients usually present with fever and sore throat, and most exhibit the gray pseudomembrane. Positive cultures for Group A β -hemolytic streptococcus does not rule out diphtherial pharyngitis in the presence of suggestive history and physical examination findings. Airway obstruction is the most serious sequela. Treatment involves macrolide antibiotics, horse-derived antitoxin, and active immunization.

- 21** Answer C. Enteroviruses, such as coxsackievirus, account for more than half of all the cases of encephalitis. Herpes virus is the most common cause of severe encephalitis in the United States. Typically, in frank infections of the brain parenchyma (encephalitis), there is some degree of concomitant infection and inflammation of the meninges. Therefore, *meningoencephalitis* is a more accurate term describing most of these infections. When the infection is limited to the meninges, it is termed *meningitis*, reflecting meningitis in the absence of a pyogenic organism. Mumps is another important cause of aseptic meningitis, especially in the setting of outbreaks of the virus such as in Iowa in early 2006. Meningoencephalitis is the most common complication of childhood mumps and frequently occurs at the same time as parotitis. Neurocysticercosis is a rare cause typically found in immigrants from areas where undercooked pork harboring the parasite *Taenia solium* may be eaten. Adenovirus is an uncommon cause.

- 22** Answer B. The patient has acute mastoiditis. There is erythema behind the auricle in the setting of otic pain. Mastoiditis is usually seen as a complication of otitis media and occurs when the mastoid air cells are blocked by infectious debris. Streptococci are the most common cause. The infection can spread to cause a generalized skull osteomyelitis with associated cranial neuropathies and meningitis. Diagnosis is primarily made clinically, but CT scan of the mastoid area can provide important information for the consulting ENT doctor. Plain radiographs are too insensitive for the diagnosis. MRI is not necessary in the acute setting. Tympanocentesis is unlikely to change management. Lumbar puncture is indicated only in the setting of signs and symptoms of associated meningitis, but a CT scan should be performed first to assess for possibility of mass effect from localized infection. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:135.)

- 23** Answer B. Foods are the single most common cause of anaphylaxis although up to one third of causes are unknown. Exercise accounts for 7% of anaphylaxis cases. Anaphylaxis occurs as an immediate type I hypersensitivity reaction mediated by immunoglobulin E (IgE) antibodies. It requires prior sensitization to the allergen in order to develop allergen-specific IgE antibodies. Subsequent exposure to the allergen allows mast cell and basophil degranulation leading to the subsequent anaphylactic

response. Anaphylactoid reactions are immediate type I hypersensitivity reactions that do not require prior allergen sensitization and which clinically mimic anaphylaxis. Anaphylactoid reactions (e.g., response to iodinated radiographic contrast material) typically require a larger dose of the offending agent but the clinical management is identical to anaphylaxis. Patients at the extremes of age are less likely to have anaphylaxis, probably because of less mature immune responses.

24 Answer B. Mannitol is used in patients with severe head injury and signs of increased intracranial pressure. It functions primarily as a diuretic to limit cerebral edema, but has important secondary functions as a volume expander and antioxidant. Mannitol improves cerebral perfusion pressure by increasing mean arterial pressure and decreasing intracranial pressure. It begins to work within 10 minutes, peaks at approximately an hour, and lasts up to 6 hours. Mannitol has no coagulant properties and does not limit the extent of bleeding. It does not inhibit the inflammatory cascade. Mannitol has no direct effect on seizure prevention except by reduction of intracranial pressure and hypoxia. Renal failure is an important adverse effect that may occur with repeated doses.

25 Answer B. Flexible endoscopy is the procedure of choice for removal of esophageal foreign bodies. A recent trial demonstrated that between 25% and 33% of esophageal coins will spontaneously pass without complications within 8 to 16 hours of ingestion. Spontaneous passage is more likely in older, male children with coins lodged in the distal third of their esophagus. However, this patient has already presented after a tincture of time has passed, and endoscopy remains standard of care. Papain, a proteolytic enzyme that is a common active ingredient in commercially available meat tenderizer, has been used in the past to aid in the passage of impacted meat boluses. However, its use is associated with an unacceptably high rate of complications including esophageal perforation, aspiration pneumonitis, and hemorrhagic pulmonary edema. Therefore, its use should be avoided in the ED. Glucagon and effervescent agents such as carbonated beverages may both prove useful in alleviating an impacted food bolus. Glucagon is thought to work by relaxing the smooth muscle of the distal esophagus and most markedly, the lower esophageal sphincter. It does not have any appreciable effect on upper esophageal motility. Effervescent agents should be avoided in cases of complete obstruction or obstruction persisting for longer than 24 hours due to the theoretically increased risk of perforation due to ischemia. The Heimlich maneuver is indicated as a

life-saving technique for laypersons to help dislodge a foreign body which is obstructing a patient's airway.

26 Answer C. Hirudin, a protein originally extracted from leeches, directly inhibits thrombin without requiring antithrombin III activity. Although it also inhibits platelet aggregation, hirudin does not cause thrombocytopenia, which can be associated with both unfractionated heparin and low molecular weight heparins. It may cause a slightly higher incidence of bleeding than heparins when used clinically, and is therefore limited to use for patients who cannot use heparins due to the risk for heparin-induced thrombocytopenia.

27 Answer E. The definition of septic shock is sepsis plus inadequate tissue perfusion. This inadequate perfusion may be manifested by the presence of hypotension, but septic shock can occur in the absence of hypotension (and vice versa). The definition of sepsis is suspicion/presence of infection plus two out of the four criteria for the systemic inflammatory response syndrome (SIRS)

- Temp $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$
- WBC $>12 \text{ K}$ or $<4 \text{ K}$ or $>10\%$ bands
- RR >20 or $\text{Paco}_2 <32 \text{ mmHg}$
- HR >90

28 Answer D. Goodpasture's syndrome is characterized by glomerulonephritis and diffuse alveolar hemorrhage (DAH), associated with the presence of a glomerular antibasement membrane antibody. In the past, the 6-month mortality was 80% with half the number of patients succumbing to DAH. A recent study estimated that mortality has improved somewhat, with a 2-year survival rate of 50% in all treated patients. DAH is the most common cause of death.

29 Answer D. Barotrauma and ventilator associated lung injury (VALI) are important considerations in the mechanically ventilated patient with asthma. Injury to the lung is primarily dependent on the transpulmonary pressure (the pressure gradient between the alveoli and the pleura). Alveolar pressure is best estimated by determining the plateau pressure, which is measured by the ventilator at the end of inspiration. Because no air is flowing at the end of inspiration, plateau pressure reflects the static pressure in the ventilator circuit that is exerted on the alveolar wall. The incidence of barotrauma and VALI increases exponentially as the plateau pressure rises above 35 mm Hg. Peak airway pressure reflects the maximal pressure achieved in the ventilator circuit throughout a ventilatory cycle. The pressure is typically maximal during inspiration when air

is being pushed into the lungs by the ventilator. Most of this force is absorbed by the "resistance airways" (primarily medium-sized bronchi) rather than the alveoli. Therefore, slight elevations in peak airway pressure are better tolerated than elevations of plateau pressure. Furthermore, patients with refractory asthma usually have significant airway obstruction and require high inspiratory flow rates and correspondingly short inspiratory times. This maximizes the time for expiration, thereby limiting air trapping and a subsequent increase in plateau pressure. However, peak pressure rises as a result of this strategy and should be tolerated in order to preserve normal plateau pressures. PEEP is often not used when mechanically ventilating patients with asthma due to intrinsic air trapping, which generates auto-PEEP. Lower tidal volumes are often necessary in asthmatic patients to ensure adequate exhalation, avoiding air trapping.

30 Answer A. This patient has primary adrenal insufficiency. Owing to mineralocorticoid deficiency, the most common electrolyte abnormalities are hyponatremia and hyperkalemia. Hypoglycemia due to decreased gluconeogenesis and increased peripheral glucose utilization is also common. The patient's hyperpigmentation is due to increased adrenocorticotrophic hormone (ACTH) secretion by the pituitary gland and subsequent stimulation of melanocytes. More than 50% of patients with adrenal insufficiency have intermittent nausea and vomiting, and often present with volume depletion.

31 Answer B. Despite their widespread use, neither intravenous corticosteroids nor racemic epinephrine has been shown to be beneficial in the management of adult epiglottitis. The foundation of effective management is the early administration of appropriate antibiotics and airway management, which may include early intubation or observation in a monitored setting. While *H. influenzae* type B remains an important cause of this disease in adults (the *Haemophilus influenzae* type b [Hib] vaccine has drastically reduced this entity in children), it is found in as few as 17% of cases. Other important bacterial causes include *Streptococcus*, and numerous gram-negative organisms. While ampicillin was a drug of choice in the past, *H. influenzae* and other pathogens are increasingly resistant to this therapy due to the presence of β -lactamase. Therefore, second and third-generation cephalosporins are the drugs of choice (e.g., ceftriaxone, cefotaxime, ceftizoxime). Humidified oxygen is another component of epiglottitis therapy that has no proven benefit. However, because there is little potential harm in humidifying delivered oxygen, it remains a part of recommended treatment.

32 Answer C. During primary and secondary survey of all victims of violent crime, care must be taken to identify objects which are potentially lethal to caregivers. Handguns are particularly dangerous as they may discharge with only minimal movement during exposure of the patient. Any firearm should preferably not be handled at all—if it is in a potentially dangerous position, it should be placed carefully in a safe location and secured by law enforcement. Care providers should never check to see if the firearm is loaded, fire it, or carry it on their person in case spontaneous discharge occurs. Using the firearm for any reason is obviously contraindicated.

33 Answer A. The patient has evidence of acute renal failure, with abnormal BUN and creatinine levels. Etiologies include prerenal azotemia, intrinsic renal disease, and postobstructive uropathy. No specific history is given to indicate any particular cause so the diagnosis must be based on laboratory data. The fractional excretion of sodium (FENa) is used as surrogate to measure the reabsorption capacity of the kidneys—a low urinary sodium indicates that the kidneys are adequately reabsorbing sodium and working appropriately. The FENa is calculated from the serum and urine sodium and creatinine values according to the following equation

$$\text{FENa} = \frac{(\text{Urine Na})(\text{Plasma Cr})}{(\text{Urine Cr})(\text{Plasma Na})}$$

A FENa <1% implies adequate sodium reabsorption and a prerenal process—the kidneys are working appropriately, responding to reduced blood volume by conserving sodium and water. A FENa >1% implies either intrinsic renal disease or postobstructive uropathy. In this patient, the FENa is <1%, indicating a prerenal cause such as diarrhea from gastroenteritis. Transitional cell carcinoma and prostatic hypertrophy would both cause chronic obstruction and a FENa >1%. Acute tubular necrosis and pharmacologic diuresis also cause a FENa >1%.

34 Answer A. Roughly 70% of patients with meningococemia have a rash which usually begins as petechiae of the wrists and ankles. However, the rash may also be composed of light pink macules that become petechial later in the disease course. Petechial lesions may have a "smudged" appearance although purpura may have a "gun-metal gray" center. Rubella and rubeola are maculopapular eruptions that tend to begin on the face and spread inferiorly. Henoch-Schönlein purpura (HSP) is a vasculitis that is characterized by palpable purpura on the buttocks and lower extremities. Pityriasis rosea is a benign, self-limited rash characterized by patches and plaques that typically occur on the trunk.

- 35 Answer E. High-altitude pulmonary edema (HAPE) is the most common cause of high altitude-related death. The mechanism is not completely understood but it is thought to result from overperfusion of a constricted pulmonary vascular system and subsequent vascular injury and leak. Clinical symptoms include a dry cough, dyspnea on exertion, and fatigue with minimal effort. Symptoms typically worsen at night, and patients decompensate resulting in dyspnea at rest, cyanosis of the nail beds and lips, and development of a productive cough and severe weakness. Orthopnea is an uncommon finding. Dyspnea at rest is the hallmark of severe disease. The crucial therapeutic action is immediate descent and the application of high-flow oxygen. In most cases, these steps alone will resolve symptoms. However, nifedipine, furosemide and morphine may all be useful as adjuncts. Nifedipine causes pulmonary vasodilation and is thought to counteract the high pulmonary vascular resistance in HAPE. Nifedipine may also be used for prophylaxis.
- 36 Answer A. Standard treatment for pediatric patients with acute gastroenteritis is oral rehydration therapy (ORT). Standard solutions are available and consist of hypotonic fluid and essential electrolytes. Administration of ORT may occur in the ED, hospital floor, or at home. Patients may continue to have vomiting and/or diarrhea and still be candidates for ORT. Contraindications to ORT include shock, lethargy, severe abdominal tenderness or rebound, bowel obstruction, and severe underlying medical illness. Failure of ORT should necessitate intravenous fluid hydration. Treatment of acute gastroenteritis with ORT observed in the ED is cost-effective and clinically efficacious. Hospital admission may be prevented by this ED observation of parent-administered ORT.
- 37 Answer C. Fluoxetine is a type of selective serotonin reuptake inhibitor (SSRI). As a class, SSRIs are generally benign in overdose, causing mild GI and CNS symptoms and rarely leading to dysrhythmias. Cyproheptadine is a serotonin antagonist that has unproven clinical efficacy in most SSRI overdoses. Its use is mainly limited to patients with serotonin syndrome, a constellation of neurologic, GI, and cardiac findings. Dysrhythmia is rare and should be treated according to current advanced cardiac life support (ACLS) guidelines. Unlike with tricyclic antidepressant overdose, there is no indication for routine use of sodium bicarbonate to treat dysrhythmias. As in virtually all overdoses, ipecac is not recommended as a method of gastric decontamination. Hemodialysis is not indicated in patients with SSRI overdose, as the drug is highly bound to plasma proteins.
- 38 Answer E. Enterotoxigenic *Escherichia coli* (ETEC) is responsible for 45% to 50% of traveler's diarrhea. *Shigella* is the second most common cause of traveler's diarrhea, whereas viral causes and protozoa make up the remainder.
- 39 Answer C. Septic arthritis in children is most commonly caused by *S. aureus*. Gonococcal infection is the most common cause in sexually active adolescents and young adults. Pneumococcus and Group A streptococcus are important (but less common) causes of septic arthritis in all age-groups. *Haemophilus* infection has decreased in incidence due to Hib vaccine. Septic arthritis is the most important diagnosis to rule out in children presenting with unilateral hip or knee pain or limp. Joint aspiration is the only completely reliable method of ruling out the diagnosis, although presence of fever, joint tenderness, and abnormalities in WBC and erythrocyte sedimentation rate (ESR) levels may aid identification of those patients who should undergo arthrocentesis. Treatment of septic arthritis in children should always include admission, an antistaphylococcal antibiotic, and surgical irrigation. Vancomycin should be considered in patients at high risk for methicillin resistance.
- 40 Answer B. The Sgarbossa criteria were devised to assess the likelihood of infarction in patients with a left bundle branch block. Three different electrocardiographic criteria are given specific scores: A total score of 3 or greater indicates that the patient likely has acute MI. Concordant (in the same direction as the QRS complex) ST elevation >1 mm is given 5 points, ST depression >1 mm in V1-V3 is given 3 points, and discordant ST elevation >5 mm (in the opposite direction as the QRS complex) is given 2 points.
- 41 Answer A. In practice, probably the most common complication is the ampicillin or amoxicillin-associated rash that occurs when patients with Epstein-Barr virus (EBV) pharyngitis are mistakenly treated for a bacterial pharyngitis. Such a rash may occur in up to 95% of patients with EBV pharyngitis who are treated with one of these two medications. The rash occurs less commonly when patients are treated with other β -lactam antibiotics. Elevations of the hepatic enzymes AST and ALT commonly occur (up to 80%) to approximately four times the upper limit of normal, and peak during the second to fourth week of illness. However, levels well over 1,000 may occur. Jaundice may also be seen

(5%) but coagulopathy is not typical. Spontaneous recovery is the rule, and supportive care is the only required treatment. Airway obstruction is probably the most important complication for the emergency medicine physician. It is due to tonsillar hypertrophy and occurs more commonly in young children because of their prominent lymphoid tissue. Overall, however, this complication occurs in <5% of patients and can usually be managed conservatively by elevating the head of the bed, giving intravenous fluids and corticosteroids and using humidified air. Splenic rupture receives a lot of attention, but occurs in <0.5% of adults with EBV infection. The rate in children is thought to be much lower. It most commonly occurs in the second and third week of illness, and is rarely fatal when it does occur. Patients present with left upper quadrant abdominal pain, with or without radiation to the left shoulder (Kehr's sign), and splenic rupture should be considered especially in the setting of shock. Numerous hematologic complications are associated with EBV infection, including autoimmune hemolytic anemia (3%), mild thrombocytopenia (25% to 50%), and mild transient neutropenia (50% to 80%). Headache is the most common neurologic manifestation of EBV infection (50%), although meningoencephalitis is the most common severe neurologic complication (1% to 5%).

- 42** Answer C. The patient has evidence of acute testicular torsion, with scrotal pain, nausea, vomiting, and testicular tenderness. Pathophysiology involves twisting of the testis on the spermatic cord due to an anatomic abnormality or trauma. The most sensitive physical examination finding is the cremasteric reflex—presence of this reflex virtually rules out the diagnosis. Diagnosis can be made clinically in some cases, but confirmation is made with color Doppler ultrasonography, which has excellent sensitivity and specificity when performed by experienced operators. Prompt diagnosis is essential, as testicular survival is directly dependent on duration of symptoms—if surgical management is instituted within 6 hours of pain, approximately 100% of cases are salvageable. Advanced imaging techniques such as CT and MRI scans do not add to the diagnostic accuracy of testicular torsion and waste valuable time. Retrograde urethrogram is used to diagnose traumatic injuries to the urethra and is not indicated here. The bulbocavernosus reflex is used to evaluate spinal cord injuries in trauma patients and has no role in the evaluation of the acute scrotum.

- 43** Answer A. All of the above are potential intracranial complications of otitis media, but direct spread causing meningitis is the most common.

- 44** Answer B. A regular, narrow-complex tachycardia at a rate of close to 200 without P waves is likely due to paroxysmal arteriovenous nodal reentrant tachycardia (AVNRT). The initial treatment for a hemodynamically stable patient with AVNRT is adenosine, which is safe to use in pregnancy. Digoxin, amiodarone, and procainamide are not indicated as first-line therapy for AVNRT. Lidocaine is not indicated for any narrow-complex tachycardias.

- 45** Answer A. The patient has phlegmasia cerulea dolens, which is diagnosed by the clinical triad of cyanosis, pain, and edema due to massive lower extremity venous thrombosis. The cyanosis is due to a combination of increased venous backflow and compromised arterial flow. Phlegmasia alba dolens is similar but lacks cyanosis and instead appears as a blanched extremity. Treatment involves admission, intravenous anticoagulation, and possibly surgical thrombectomy and fasciotomy. (Figure courtesy of William S. Schroder, MD. Reprinted with permission from Schroder WS. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:203.)

- 46** Answer B. The patient has evidence of nephrotic syndrome with proteinuria accompanied by generalized fluid overload and nonspecific constitutional symptoms. Periorbital edema is often the first location where fluid overload is noted. Frank renal failure does not usually occur in patients with nephrotic syndrome. In children, minimal change disease is the most common cause. Hypoalbuminemia, thrombophilia, and hyperlipidemia are characteristic. UTI is not usually concomitant or causal. Although microscopic hematuria may be present, gross hematuria is rare and suggests glomerulonephritis, infection, stone, tumor, or extrarenal cause. Acute management generally involves careful fluid resuscitation, systemic corticosteroid therapy, and admission for observation and possible renal biopsy.

- 47** Answer D. Bloody diarrhea in a traveler or immigrant from an endemic area should always raise the possibility of amebic colitis. While patients with bacterial dysentery can also have bloody stools and crampy abdominal pain, their symptoms do not typically last for longer than 1 week. Enterotoxigenic *E. coli* is the most common cause of traveler's diarrhea, but is noninvasive, causes a nonbloody, watery diarrhea, and typically resolves within a few days to a week. *Entamoeba* is found worldwide but it is particularly endemic to the Indian subcontinent, central and South America and Africa. Extraintestinal man-

ifestations, the most common of which is a liver abscess, only rarely occur.

48 Answer B. Haloperidol is a high-potency antipsychotic agent whose primary therapeutic action is to block dopamine-2 receptors in the basal ganglia to cause rapid sedation and control of psychotic behavior. Haloperidol is commonly given with benzodiazepines for this use. Although haloperidol is often mistakenly considered to be part of the phenothiazine class of drugs (which lower the seizure threshold), it is actually part of the butyrophenone category, which does not affect the seizure threshold. Antipsychotics are α -1 antagonists (causing orthostatic hypotension) and antihistaminergic (causing sedation). Agranulocytosis is a side effect peculiar to clozapine, a newer generation antipsychotic.

49 Answer A. This patient has mesenteric ischemia, which is a disease that still has a mortality rate of 70%. Therefore, any patient older than 50 years who has risk factors for acute mesenteric ischemia and who presents with acute-onset abdominal pain should be presumed to have mesenteric ischemia until proved otherwise. The key to diagnosis is recognizing patients at risk, which includes any patient older than 50 years who presents with acute abdominal pain and who has known vascular disease, cardiac arrhythmias, recent MI, hypovolemia, hypotension, or sepsis. The most commonly cited clinical finding is patient pain that is out of proportion to tenderness elicited on physical examination. This is a nonspecific finding that needs to be considered carefully in light of the clinical scenario. Unfortunately, there are no laboratory markers or radiologic studies apart from angiography that have sufficient sensitivity and specificity to exclude acute MI early in its course. Lactate levels are elevated in approximately 100% of patients with bowel infarction, but this is a late finding and mortality rates are high by the time infarction has occurred. Plain films are most commonly nonspecific, although even minimal findings such as ileus correspond to more severe disease and a higher mortality rate. The sensitivity of CT has been cited to be as high as 82%, but the most common early finding is bowel wall thickening, present in 26% to 96% of cases. Unfortunately, this is also the least specific finding and is often not present in mesenteric ischemia due to arterial embolism or thrombosis, which are the most common causes of acute MI. Pneumatosis intestinalis or gas in the portal venous system is a specific finding but is only present after bowel infarction has occurred. Angiography is the key to diagnosis and allows for

therapeutic intra-arterial infusion of papaverine, a potent vasodilator, or thrombolytic drugs.

50 Answer E. Only dialysis can definitively remove ethylene glycol from the body. Ethanol and fomepizole are temporizing measures to inhibit alcohol dehydrogenase from catalyzing the conversion of toxic alcohols into their toxic metabolites. Pyridoxine and thiamine are cofactors in the conversion of glyoxylic acid, a toxic metabolite of ethylene glycol, to nontoxic compounds. They are useful as adjunctive therapies for ethylene glycol poisoning, but do not constitute definitive therapy.

51 Answer E. The patient has evidence of acute monoarticular arthritis. In a young, sexually active patient without prior history of arthritis, the most likely bacterial cause is gonococcus. The overall most common cause of septic arthritis is *S. aureus*. Choices B, C, and D are less common causes. Septic arthritis is a joint-threatening infection diagnosed by synovial-fluid analysis. It must be aggressively treated with intravenous antibiotics and possible surgical irrigation, even though gonococcal arthritis rarely requires surgical management.

52 Answer E. The anterior circulation refers to the region of brain tissue served by the internal carotid arteries. Approximately 80% of cerebral blood flow is derived from the carotid arteries. This includes the anterior cerebral artery, the middle cerebral artery and the ophthalmic artery (branch of the internal carotid artery just before joining the circle of Willis). Hemiparesis and hemisensory loss of the leg is a result of anterior cerebral artery ischemia. Transient monocular blindness (amaurosis fugax) is a result of ischemia in the ophthalmic artery. Aphasia and hemiparesis are due to ischemia in the middle cerebral artery. Ataxia and vertigo along with nausea and vomiting are caused by posterior circulation ischemia (to the cerebellum). The posterior circulation originates in the vertebral arteries (which originate from the subclavian arteries), which join to form the basilar artery and then bifurcate to form the two posterior cerebral arteries. This system supplies the remaining 20% of cerebral blood flow, delivering blood to the cerebellum and brainstem as well as to the visual occipital lobe and medial aspect of the temporal lobe.

53 Answer E. Wolff-Parkinson-White (WPW) syndrome is the most frequently occurring accessory pathway syndrome. Patients have an accessory conductive pathway from the atria to the ventricles which preexcites the ventricular myocytes before the AV node releases the normal sinoatrial depolarization. As a result, patients with WPW have a shortened

PR interval and a delayed QRS upstroke, called the δ wave. Patients with WPW syndrome can have reentrant dysrhythmias, where the accessory pathway can either conduct retrograde (where the AV node conducts in the normal direction, producing a narrow QRS complex and an "orthodromic" pattern) or anterograde (where the AV node conducts backwards, producing a wide QRS complex and an "antidromic" pattern). A patient with WPW syndrome, tachycardia, and wide QRS complexes suggests the presence of an antidromic conduction pattern (where the accessory pathway conducts anterograde and the AV node conducts retrograde). AV nodal active agents are contraindicated in this circumstance, as inhibition of the AV node will cause faster conduction through the anterograde accessory pathway, which is already at high risk for degeneration into an unstable rhythm. The treatment of choice in stable antidromic or irregular tachycardias in WPW patients is amiodarone or procainamide. Unstable patients require cardioversion.

54 Answer A. *Mycobacterium tuberculosis* can affect nearly any organ system in the body. The most common extrapulmonary manifestation is painless lymphadenopathy, usually in the cervical region. Although classically described as a disease of childhood, the peak incidence is between 20 and 40 years of age. Although the nodes are initially discrete, they may form a firm, matted, nontender mass over time. Pericarditis may result from direct extension TB from mediastinal lymph nodes, or the spine, lungs, or sternum. The onset may be insidious or acute, and may result in a restrictive pericarditis. The CNS is not spared in extrapulmonary TB, and tuberculous meningitis is the most common presentation of neurologic TB disease. In such cases, the CSF usually reveals very high protein levels, ranging from 100 to 500 mg per dL, although levels as high as 2 to 6 g per dL have been reported. In contrast, CSF glucose concentration usually is <45 mg per dL. Skeletal TB most commonly involves the spine (Pott's disease), with most lesions in the thoracic spine. Vertebral destruction usually begins at the anteroinferior portion of the vertebral body, eventually resulting in an anterior wedge defect and a palpable bony prominence posteriorly (termed *Gibbus*). *M. tuberculosis* typically spreads to the bilateral adrenal glands, causing bilateral adrenal enlargement and subsequent destruction which ultimately causes adrenal insufficiency.

55 Answer D. Ascites is the most common complication of cirrhosis, occurring in roughly 60% of patients with compensated cirrhosis for 10 years. Spontaneous bacterial peritonitis is a complication of ascites, and occurs in 8% to 25% of patients with cirrhosis and ascites. Esophageal varices are also

common, and occur in 25% to 40% of patients with cirrhosis. Of those patients, 30% develop bleeding within 2 years. Hepatic encephalopathy is also a common complication, but its incidence depends on the criteria used to diagnose encephalopathy. It most commonly presents as a sleep disturbance, although patients may have trouble with mood, disorientation, or speech.

56 Answer D. The Mantoux test is the most common test used to screen for TB exposure and infection. It consists of an intradermal injection of 10 units (0.1 mL) of a standardized purified protein derivative (PPD) from *M. tuberculosis*. Positivity is determined by the amount of induration, not erythema, in response to the injection and is typically measured between 48 and 72 hours. Induration <5 mm in diameter is negative and induration >15 mm is positive. Induration between 5 and 15 mm may be positive, depending on other factors, such as prior immunization with Bacille Calmette-Guérin (BCG) or the presence of immunosuppression as in patients with HIV. As the BCG vaccine is not used in this country, and because this patient is American-born, BCG is an unlikely cause of his positive test result. In this country, patients with HIV are considered to have a positive PPD if the amount of induration exceeds 5 mm, as are patients who have had close contact with active TB, and patients who have a fibrotic chest x-ray. Patients in any other high-risk group are considered positive when the amount of induration exceeds 10 mm in diameter. Regardless of the group to which a patient belongs, a positive PPD means that a patient has been exposed to and infected with *M. tuberculosis* and that the organism remains in their body. Because this patient does not have symptoms of active disease (e.g., fever, cough, hemoptysis, night sweats, anorexia, weight loss) and does not have any findings on his chest x-ray, he has latent, not active disease. Patients with latent TB infection are not contagious, but they require treatment with INH to dramatically reduce their lifetime risk of developing active TB.

57 Answer B. Alcohol withdrawal occurs as early as 6 hours after cessation of alcohol consumption and generally peaks at 2 to 3 days of abstinence. Signs and symptoms are similar to a sympathomimetic toxidrome—hyperthermia, tachycardia, hypertension, tremor, anxiety, hallucinations, and seizures. Particularly severe cases are often referred to as *delirium tremens*, which may be life threatening. Management of alcohol withdrawal involves aggressive supportive care with fluids, vitamin and electrolyte supplementation, and benzodiazepine therapy. Although no single benzodiazepine is more efficacious than

another, lorazepam is preferred due to its multiple routes of administration and predictable pharmacokinetics. Haloperidol and droperidol are two drugs of the butyrophenone class which are used as adjunctive therapy to manage agitation, but have no effect in preventing seizures. Chlordiazepoxide is a benzodiazepine that may be used to treat alcohol withdrawal but has prolonged half-life in patients with renal insufficiency. Diphenhydramine, an antihistamine and anticholinergic agent, has no role in the management of alcohol withdrawal.

- 58** Answer C. Sprains refer to ligamentous injuries and may be graded according to the severity of injury—grade I is a mild injury to ligamentous fibers with minimal tenderness and edema, grade II is a moderate injury with partial tearing of the ligament and moderate tenderness and edema, and grade III injuries refer to complete disruption of the ligament causing instability of the joint. Ligamentous (especially grade II and III) injuries take several weeks to months to heal. Immobilization of the affected joint is indicated and motion of other joints is indicated to prevent stiffness. Although less comfortable for the patient than heat, cold therapy minimizes the hemorrhage and edema accompanying ligamentous injuries and probably improves healing and recovery times. Thermotherapy appears to have no similar pathophysiologic effect. Acetaminophen and ibuprofen are roughly equivalent in regard to pain control in most traumatic conditions. Emergent MRI is almost never indicated in acute injury, except in cases of suspected acute cauda equina syndrome (CES).

- 59** Answer C. Although there is no consensus, a cumulative dose of 5 rads has been proposed as an acceptable threshold for safe fetal exposure. Intrauterine exposure of 10 rads is associated with a small increase in the number of childhood cancers, but does not result in an increase in fetal malformations, spontaneous abortion, or growth retardation. Maternal plain films of the head, cervical spine, thoracic spine, chest, and extremities each expose the fetus to <5 mrad (i.e., 1,000 times less than the safe threshold). Plain films of the lumbar spine, hip, and pelvis expose the fetus to higher doses, but none of these studies comes close to approaching 5 rads. CT scanning of the abdomen, however, results in approximately 2.6 rads of fetal exposure. In comparison to these films, the cumulative radiation exposure to fetus over a 9-month gestation is between 50 and 100 mrad (far more than a single chest x-ray). Lead shielding of the maternal abdomen can reduce fetal exposure by 50% to 75%. The risk to the fetus during the first 2 weeks of pregnancy is so low that normal radiographic procedure can be

used. The period of highest risk is between 2 and 7 weeks (organogenesis). Finally, FAST examination is poorly sensitive in the second and third trimesters. Therefore, CT scanning should be performed in all patients in whom abdominal injury is suspected.

- 60** Answer B. The causes of painless hematuria vary by age and gender. The most common cause in children is glomerulonephritis, in young adults and older women, UTI, and in older men, bladder cancer. Renal carcinoma is a less common cause of painless hematuria in all age-groups. Nephrotic syndrome causes proteinuria without frank hematuria. The combination of urinalysis and appropriate imaging studies (such as helical CT scan) yields the diagnosis in most cases.
- 61** Answer D. Patients older than 50 years are at risk for *S. pneumococcus* and *N. meningitidis*, as well as *L. monocytogenes*. Ceftriaxone covers pneumococcus, whereas vancomycin is necessary for resistant pneumococcus. However, in older patients at risk for *Listeria* infection, ampicillin is also necessary. Patients younger than 50 who are immunocompromised or who are alcoholic are also at risk for *Listeria* infection and should be covered with ampicillin. All patients with suspected meningitis should be given 10 mg of dexamethasone IV just before or with the first dose of antibiotics. Adjunctive dexamethasone reduces mortality and neurologic sequelae. The reduction is most marked in patients with intermediate disease severity, defined as those patients with a Glasgow Coma Scale rating of 8 to 11, as well as in patients with pneumococcal meningitis. Amphotericin is used for confirmed fungal infections.
- 62** Answer B. Pulmonary contusion refers to direct parenchymal injury from blunt thoracic trauma. It is often associated with other intrathoracic and chest wall injuries, most commonly multiple rib fractures. Impaired oxygenation and ventilation may cause severe deficits in respiratory function requiring endotracheal intubation and mechanical ventilation. The diagnosis is made by initial chest radiography, although CT scan is more sensitive and able to detect other thoracic injuries as well. Atelectasis and pneumonia are the most common complications of pulmonary contusion, but may take several days after the injury to develop. Prophylactic antibiotics before the onset of clinical signs and symptoms of postcontusion pneumonia are not recommended. ARDS may develop in patients with particularly severe pulmonary contusions but is less common than concomitant pneumonia. Pulmonary embolism may also occur in patients who are bedridden after severe traumatic injuries but do not occur at significantly

higher rates in patients with pulmonary contusion. Myocardial contusion and pericardial tamponade may occur from the same blunt traumatic forces that caused the pulmonary contusion but do not generally occur as a complication of isolated pulmonary contusion.

63 Answer C. The patient has a large central corneal abrasion as demonstrated by the irregular patch of fluorescein uptake from 3 o'clock to 6 o'clock. Treatment of corneal abrasions involves pain control with topical or oral analgesics, short-acting cycloplegics, and topical antibiotics to prevent secondary infection. Topical antivirals would be indicated in patients with herpes simplex or zoster keratitis, which are signaled by the presence of dendrites or pseudodendrites, respectively. Topical steroids should never be given by the emergency physician (EP) without ophthalmologic consultation beforehand, as consequences may be devastating in patients with herpetic keratitis. Acetazolamide is used to increase aqueous humor excretion as part of noninvasive temporizing therapies for acute glaucoma attacks. Emergent ophthalmologic consultation is not indicated in patients with corneal abrasions, even in patients with abrasions associated with contact lenses. If there is suspicion of corneal ulcer (which would appear as a yellowish spot on the cornea), then consultation should be obtained emergently. (Figure courtesy of Anthony Morroco, MD. Reprinted with permission from Morroco A. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:135.)

64 Answer A. Sarcoidosis is a multisystem disease of unknown cause characterized by the presence of noncaseating granulomas in multiple tissues. The incidence peaks in the 20s to 30s, with women slightly more affected than men, whereas it is three times more common in blacks than in whites in the United States. Systemic symptoms such as fatigue, fever, and anorexia are the most common presenting symptoms. The lungs are the most common organ system affected and patients may present with symptoms of cough or dyspnea. Patients may also present with vague chest discomfort that is atypical in nature. Skin lesions such as erythema nodosum or lupus pernio (a violaceous, purpuric rash of the nose, cheeks, and ears that is more common in blacks) affect 25% of patients. Sarcoidosis produces symmetric arthralgias or arthritis, and usually affects the larger joints such as the wrists, elbows, knees, and ankles. Two thirds of patients have spontaneous resolution of symptoms within 2 years, whereas 10% to 30% of patients have persistent symptoms beyond this point. Mortality from the disease is low.

65 Answer D. The patient has evidence of chancroid, caused by *H. ducreyi*, a gram-negative bacillus. A painful chancre-like lesion combined with a solitary tender unilateral lymph node which may also ulcerate is classic. Chancroid, unlike syphilis (caused by *T. pallidum*), is painful and tender. Treatment of chancroid is with azithromycin or ceftriaxone. Herpes simplex virus can cause ulcerated or vesicular lesions, but these are usually grouped and Gram stain of the lesions will be negative. *C. trachomatis*, a spirochete, may cause lymphogranuloma venereum, which is manifested by a painless ulcer combined with significant lymphadenopathy with a negative Gram stain. *S. epidermidis* may cause skin lesions in the genital region but Gram stain would show gram-positive cocci.

66 Answer A. Patients with testicular torsion will almost never exhibit a normal cremasteric reflex on the affected side. The sensitivity of this sign is extremely high (>95%). Prehn's sign refers to relief of scrotal pain on elevation of the scrotum. Prehn's sign was previously thought to distinguish epididymitis from testicular torsion, but has been found to be inaccurate in this regard. Although urinalysis is usually normal, up to one third of patients with torsion may have detectable urinary leukocytes. Fever is present in 20% and vomiting in 30% of cases, so absence of either should not be used to rule out the diagnosis.

67 Answer B. As with adults, neonatal hypoglycemia is treated with dextrose. Traditionally, D25 and D50 have been discouraged because of rebound hypoglycemia in hyperinsulinemic infants. In addition, D25 and D50 are thought to put the infant at risk for a potentially dangerous rise in plasma osmolarity. Glucagon is useful as a second-line agent if the infant is refractory to dextrose. Octreotide and diazoxide are useful agents in infants with hyperinsulinemia but are not usually necessary in the ED.

68 Answer C. Neurologic symptoms of paresthesias combined with dorsal column findings in the face of macrocytic anemia are indicative of vitamin B₁₂ deficiency. Ataxia, depression, and paranoia may also accompany these symptoms. Pain and temperature are usually spared, as these sensations are not carried by the dorsal spinal columns. Causes of vitamin B₁₂ deficiency include chronic malabsorption, strict vegetarian diet, chronic alcohol use, ileal disease, and pernicious anemia. Chronic smoking can cause COPD, which may lead to polycythemia rather than anemia. Chronic aspirin use and melena can predispose patients to iron-deficiency anemia, which

is either microcytic or normocytic. Family history of thalassemia may be a risk factor for younger patients to develop a well-compensated microcytic anemia, but has little relevance in an older adult.

69 Answer C. Epidural hematoma is usually due to a traumatic injury to the temporal area, causing damage to the middle meningeal artery. This leads to blood accumulating between the skull and the dura, causing a biconvex, lens-shaped hematoma readily seen on noncontrast CT scan of the brain. Signs and symptoms from an arterial source of the epidural hematoma occur immediately, but a venous cause may produce a delayed presentation. Mortality from epidural hematoma is rare with early diagnosis and surgical treatment, and even most patients who present in coma do not die of their head injury. The "lucid interval," described as a period where patients awaken from their altered state and have normal mental status before suddenly becoming comatose again, is neither sensitive nor specific for the diagnosis of epidural hematoma. Almost all patients are symptomatic, with headache, vomiting and altered mental status as the most common manifestations.

70 Answer D. Emergency thoracotomy is most useful and successful in patients with penetrating chest wounds who develop traumatic cardiac arrest during or just before the ED resuscitation begins. Patients with pericardial tamponade due to stab wounds have the highest survival rates after ED thoracotomy. In the past, thoracotomies were performed routinely in the ED for traumatic arrest patients. However, concerns about risk to hospital personnel, cost, and low success rates of the procedure have restricted indications for thoracotomy to penetrating chest wounds. Any patient with blunt trauma (even to the chest) is not a candidate for ED thoracotomy.

71 Answer E. The femoral and humeral heads are at significant risk for avascular necrosis after fracture due to interrupted blood supply. Intra-articular and four-part fractures of the humerus pose an especially high risk. Elbow injury may occur in association with humeral head fracture, but does not significantly increase morbidity. Adhesive capsulitis is managed conservatively with range-of-motion exercises and generally responds well. Pneumothorax is rare in patients with humeral head fractures except when they are associated with rib or scapular fractures. Although scapular fracture may be associated with humeral head fractures, the vast majority of humeral head fractures do not involve scapular fractures. Furthermore, scapular fracture by itself does not contribute significantly to morbidity or mortality;

this is due to the commonly associated serious thoracic injury.

72 Answer A. High-altitude cerebellar ataxia (HACE) is the most severe form of high-altitude illness and typically follows acute mountain sickness (AMS). Therefore, symptoms of AMS (headache, fatigue, nausea, dizziness, anorexia, and difficulty sleeping) precede the development of HACE. However, AMS may progress to HACE in as little as 12 hours although 1 to 3 days is more typical. Most cases of severe HACE occur above 12,000 ft. In addition to symptoms of AMS, the cough and dyspnea of high-altitude pulmonary edema (HAPE) are also typically present. Specific signs for HACE include generalized seizures, slurred speech, rare neurologic deficits, delirium, and ataxia.

73 Answer A. Nitroprusside reacts with acetoacetate at concentrations of 5 to 10 mg per dL to produce a purple color. It does not react appreciably with other ketones.

74 Answer E. The most sensitive CT technique appears to be thin-cut helical CT with rectal contrast. As many patients will refuse such an examination, an alternative study is CT of the abdomen and pelvis after oral contrast administration. However, a delay of 60 to 90 minutes is required to allow the contrast to reach the distal small bowel and cecum. CT scanning is less sensitive in thin patients and in children because periappendiceal fat stranding is harder to detect due to the dearth of fat. CT scanning in patients with only a few hours of symptoms is less sensitive than patients who have more prolonged symptoms. In patients with early signs and symptoms of appendicitis, changes occurring in the appendix may not yet be visible by CT. Therefore, normal scans in such patients may provide a false sense of comfort, and such patients should be carefully instructed that they may still get worse. Finally, ultrasonography is a useful study for the diagnosis of appendicitis, especially in children and pregnant women. However, a negative study does not conclusively rule out appendicitis, especially if a normal appendix is not visualized. Furthermore, ultrasonography is less useful in cases of appendiceal perforation. Therefore, further diagnostic study with CT should be performed.

75 Answer C. The causes of painless hematuria vary by age and gender. The most common cause in children is glomerulonephritis, in young adults and older women, UTI, and in older men, bladder cancer. Renal carcinoma is a less common cause of painless hematuria in all age-groups. Nephrotic syndrome causes proteinuria without frank hematuria. The

combination of urinalysis and appropriate imaging studies (such as helical CT scan) yields the diagnosis in most cases.

- 76** Answer A. Scapular fractures occur in patients with high-force blunt trauma such as motor vehicle crashes or falls from heights. Because of its well-protected position, isolated fracture of the scapula is rare, and associated injuries to the chest and upper extremity are present in the large majority of cases. Operative repair of the scapular fracture is not usually necessary as most patients heal with conservative management and range-of-motion exercises. Patients with scapular fractures hold their ipsilateral arm in full adduction and any movement elicits extreme pain. Bilateral scapular fracture is uncommon and usually signifies life-threatening associated injuries.
- 77** Answer D. The EKG demonstrates deeply inverted T waves in the anterior leads, which is specific for the LAD distribution. When associated with unstable angina, these T waves indicate stenosis of the proximal LAD, called the *Wellen's syndrome*. Electrocardiographic findings of pericarditis include concave ST elevation, sinus tachycardia, and PR depression. Sinus tachycardia and right axis deviation are common EKG findings in patients with a pulmonary artery embolism. Lateral (I, L, V5, V6) and posterior (V1, V2) abnormalities are often seen in left circumflex lesions. Right-sided coronary artery disease (CAD) may cause an inferior MI (II, III, aVF) or posterior MI (V1, V2).
- 78** Answer C. Head trauma accounts for the large majority of all pediatric traumatic deaths. Children's heads are proportionally larger and heavier relative to the rest of their bodies than adults and are more likely to be seriously injured. Pediatric head trauma patients younger than 1 year with abnormal neurologic examination, loss of consciousness (LOC), protracted vomiting, abnormal feeding, or abnormal irritability or sleepiness should all be indications for CT scan to evaluate for intracranial injury. Controversy exists as to whether brief LOC should be considered as a sole indication for CT scan in the older child, but in the infant it is an accepted indication given the difficulty of neurologic examination. The EP should always consider contacting DCFS in cases of suspected child abuse, but a clear, consistent history with a normal physical examination is less likely to have high potential for abuse. Skull x-rays are almost never indicated in head trauma as they do not often change management and require further testing with CT scan anyway if abnormal. MRI offers little benefit over CT scan in the acute setting and is much more technically difficult in the infant. Discharging the patient home without CT scan or serial neurologic examinations is not recommended.
- 79** Answer E. The presence of a patent foramen ovale is probably the most significant risk factor for decompression sickness (DCS). In general, the risk of DCS increases with the length and depth of a dive (e.g., violating the no-decompression limits). Other risk factors include increasing age, obesity (nitrogen is lipid soluble), dehydration, fatigue, diving at high altitude, flying soon after diving, performing heavy work while diving, exercise after diving, cold water temperature, and rough seas.
- 80** Answer C. Sternal fractures are usually caused by blunt thoracic trauma and passengers wearing seat belts are at much higher risk than those who are unrestrained. The belt's position across the chest is thought to put extreme force on the sternum during rapid deceleration. Coexisting mediastinal hematoma or myocardial contusion may occur in <10% of cases, but aortic injury does not occur at appreciably higher rates. Mortality of isolated sternal fractures is <1%. Routine anteroposterior (AP) views of the chest often miss sternal fractures, but tenderness of the sternum should prompt either a lateral radiograph or CT scan, both of which demonstrate sternal fracture. Concomitant rib fractures are the most common bony injuries associated with sternal fractures, but vertebral fractures do occur at higher rates as well. Treatment involves evaluation for other thoracic injuries and aggressive pain control.
- 81** Answer D. This patient has impetigo, which is initially a superficial vesicular eruption that later develops into multiple honey-crusted lesions. In the United States, *S. aureus* is the most common cause, whereas group A *Streptococcus* is responsible for the bulk of the remainder. In cases caused by *Streptococcus*, antibiotic therapy does not reduce the incidence of poststreptococcal glomerulonephritis. Furthermore, topical therapy with mupirocin is as effective as systemic therapy, although systemic therapy is recommended when a large area is involved or when the involvement is near the mouth (allowing topical antibiotics to be licked away). The lesions are not painful even though they may be pruritic. However, regional lymphadenopathy is a common associated finding. The lesions are highly contagious and easily transmitted to other children. (Figure reprinted with permission from Pillitteri A. *Maternal and child health nursing*. Lippincott Williams & Wilkins; 2006.)
- 82** Answer A. Tularemia is a tick-borne illness caused by the spirochete, *F. tularensis*. Rabbits, rodents,

and cats are the common vectors. Human-to-human transmission rarely occurs. The most common manifestation of disease is cutaneous, with formation of skin ulcers and painful lymphadenopathy. Systemic, pharyngeal, pulmonary, and ocular disease may also occur. Diagnosis is made by clinical suspicion and confirmed with antibody titers. Treatment is with intramuscular streptomycin, although tetracyclines, aminoglycosides, and chloramphenicol may be used with lower efficacy. Pulmonary tularemia may be caused by aerosolization from a bioterrorist attack, due to the organism's extremely infectious properties.

83 Answer D. Chest x-rays are commonly ordered but rarely useful in the evaluation of patients with acute asthma. They are indicated, however, when there is clinical evidence of pneumonia, a complication of asthma, such as pneumothorax or pneumomediastinum, or a pulmonary disorder that mimics asthma (e.g., a first-time adult wheezer who fails to respond to typical asthma therapy). Approximately 15% of patients who fail to respond to optimal therapy will have an unsuspected pulmonary complication evident on x-ray. Fewer than 10% of patients with asthma exacerbations will have some kind of infiltrate on chest x-ray. Most of these abnormalities are slight increases in interstitial markings of unknown significance.

84 Answer D. This patient has a posterior hip dislocation. Posterior hip dislocations account for 90% of all hip dislocations. The most common mechanism of injury is a "dashboard injury," in which a seated patient strikes the dashboard with a flexed knee, driving the femur posteriorly. Due to the force required to dislocate the well-protected hip joint, posterior hip dislocations are often associated with multisystem trauma. Patients will present with a shortened leg, with the hip internally rotated, adducted, and slightly flexed. Posterior hip dislocations must be reduced emergently due to the high risk of avascular necrosis of the femoral head. Radiographs should be obtained before reduction, unless a pulse deficit is present. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:515.)

85 Answer B. Alkali causes liquefaction necrosis, which allows the alkali to spread to deeper tissues and cause further necrosis. Acid causes coagulation necrosis, which hardens the tissue and limits spread of the acid to deeper tissues. Chronic exposure to ultraviolet light causes long-term ocular injury and eventual blindness but acute symptoms are usually mild. Most commercially available soaps are generally

nontoxic and cause only local conjunctival irritation. Cigarette ashes may cause superficial corneal burns, but the duration of exposure is rarely long enough to produce serious injury.

86 Answer A. Arterial gas embolism (AGE) is the second most common cause of diving-related death, and the most severe form of pulmonary barotraumas. As a diver ascends, alveoli expand due to the decreasing atmospheric pressure. If the diver does not continuously expire during ascent, the alveoli will expand and may rupture. Air may then cross the ruptured alveolar-capillary membrane, enter the pulmonary venous circulation and subsequently embolize to any organ system. Embolization to the coronary or cerebral (usually anterior or middle cerebral) arteries is the most catastrophic. The most common presentation of AGE is neurologic, consisting of decreased consciousness, dizziness, confusion, headache, cranial nerve symptoms, hemiplegia, and hemisensory loss. Any diver who surfaces unconscious or who loses consciousness within 10 minutes of surfacing should be presumed to have AGE until proved otherwise. The loss of consciousness (LOC) is a sharp contrast from decompression sickness (DCS), in which LOC is rare.

87 Answer C. The patient likely has uncomplicated viral conjunctivitis, which is most commonly caused by adenovirus, given the lack of dendrites (HSV), pseudodendrites or facial rash (varicella-zoster virus [VZV]), or purulence on physical examination (bacterial). Viral conjunctivitis is extremely contagious and a sick contact is usually identified. Bacterial conjunctivitis may be difficult to distinguish early in the course from viral, but is much less common. Contact lens use is the major risk factor for pseudomonal conjunctivitis.

88 Answer D. Ciguatera fish poisoning is the most common cause of fish-related food poisoning in the United States. The classic syndrome includes the development of both GI and neurologic manifestations. The relative amount of neurologic or GI symptoms varies by region. GI symptoms occur first and include nausea, vomiting, watery diarrhea, and crampy abdominal pain. Neurologic manifestations are more variable but >90% of patients have distal and perioral paresthesias, cold allodynia, and numbness. Cold allodynia is often incorrectly referred to as *temperature reversal* due to the burning sensation patients experience when coming into contact with cool or cold objects (although it actually represents a painful, burning dysesthesia). Symptoms last an average of 1 to 2 weeks. There is no effective antidote; therefore treatment is supportive. Rare cases may be

associated with bradycardia and hypotension due to anticholinesterase activity. Such cases may require atropine and dopamine.

89 Answer A. The patient has chronic peripheral vascular disease leading to acute *in situ* arterial thrombosis in the left leg. Ankle-brachial index is >0.9 in patients without peripheral vascular disease, and bilateral reduction in the ABI indicates chronic *in situ* disease. Arterial embolism is also a very common cause of acute arterial occlusion, but the history of progressively worsening claudication before the acute event is more often seen with *in situ* thrombosis. Isolated inflammation, vasospasm, and fistulas may also cause arterial occlusion but are far less common than thrombosis and embolism.

90 Answer B. Oropharyngeal dysphagia is due to difficulty in the initiation of swallowing. Approximately 80% of cases are due to neuromuscular diseases, strokes, (CVAs) being chief among them. Polymyositis and dermatomyositis are the second most common causes. Two thirds of patients with myasthenia gravis (MG) have dysphagia, but because MG is a rare disease, they do not account for a large number of patients with oropharyngeal dysphagia. Liquids usually result in more dysphagia than solids, particularly when the liquids are extremely hot or cold. Symptoms tend to be intermittent rather than progressive.

91 Answer D. Adverse drug reactions (ADRs) are serious events that may have fatal consequences. The incidence of ADRs among hospitalized patients is estimated at 15.1%, with half of these events characterized as "serious," whereas the incidence of fatal ADRs is estimated at 0.32% resulting in $>100,000$ deaths per year. However, true allergic drug reactions (i.e., through type I IgE-mediated hypersensitivity) represent only 6% to 10% of ADRs (some reports quote as high as 25%). Although 10% of patients claim to be penicillin-allergic, 90% of those patients are subsequently found through skin testing not to have an allergy. Among those mentioned earlier, urticaria is the most likely manifestation of a true allergic response. The remaining symptoms are most likely expected side effects of drug therapy. However, it is very difficult to rely on the patient's history as nearly a third of patients with proven penicillin allergy by skin testing have vague histories.

92 Answer A. As with other spider or insect bites, a diagnosis of a brown recluse spider bite cannot be reliably made without the spider. Furthermore, there remains no evidence for any of a variety of therapies

for brown recluse spider bites, including early surgical excision, dapsone, electric shock, steroids, hyperbaric oxygen, colchicine, antihistamines, anticoagulants, or prophylactic antibiotics. Despite this, many of these therapies are still used. Dapsone, in particular, has been advocated as a means of limiting the toxic effects of the venom. It is not used as an antibiotic. Most bites result in burning pain, mild erythema, pruritus, and minimal swelling. Occasionally, hemorrhagic vesicles develop along with central necrosis in the days following the bite. Even in the case of these more severe bites, supportive therapy is all that is required.

93 Answer B. Two percent to 4% of patients with trigeminal neuralgia have MS. This patient's history of recurrent attacks of neurologic dysfunction in different regions suggests a diagnosis of MS. In addition, primary trigeminal neuralgia peaks in the sixth to seventh decade with an average onset of age 50 and $>90\%$ of patients who present are older than 40. Therefore, physicians need to have a higher suspicion for secondary causes in young patients with trigeminal neuralgia. The peak age at onset of MS is 25 to 30 years although women have a slightly younger age at onset than men. In addition, the incidence in women exceeds that in men by almost 2:1. Roughly 5% of cases are diagnosed before the age of 20 (early onset) and 10% diagnosed after the age of 50 (late onset). Other than MS, posterior fossa tumors, and vascular or aneurysmal compression of the trigeminal nerve should be considered.

94 Answer B. The patient has frank blood at the urethral meatus, which is a sign of likely urethral injury. This precludes placement of a Foley catheter by anyone but a urologist. Initially, a retrograde urethrogram is performed to evaluate for urethral injury. If this is normal, a Foley catheter may be placed and retrograde cystogram performed to evaluate for bladder rupture. Urinalysis in a trauma patient with grossly bloody urine is not helpful. Aspiration of the corpora cavernosa is indicated only in patients with priapism. (Figure copyright James R. Roberts, MD.)

95 Answer C. Autopsy studies reveal that emergency personnel, including emergency medical services (EMS) personnel and physicians, frequently misdiagnose foreign body aspiration. Although most episodes of foreign body aspiration in elderly patients occur in the presence of bystanders, sudden coughing attacks followed by severe respiratory distress is managed with cardiopulmonary resuscitation (CPR) instead of efforts to remove foreign bodies. Cardiopulmonary arrest due to asphyxia from foreign body aspiration was originally called the *café*

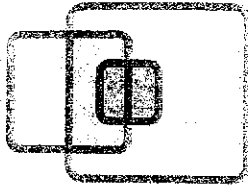
coronary syndrome. This title reinforces the notion that most bystanders interpret spastic coughing as a brief precursor to cardiac arrest rather than a sign of foreign body aspiration. Paradoxically, many studies reveal that the rate of foreign body aspiration increases in the setting of a semisolid diet. Although these data may not be definitive, it is clear that foreign body aspiration and asphyxia occur despite such "dysphagia" diets. Most foreign body aspirations in elderly patients occur at the supraglottic level. Such aspirations may therefore be theoretically visible and retrievable with fingers or Magill forceps. As with other adults, the best initial approach in the setting of aspiration is to perform the Heimlich maneuver. Back blows in adults actually directs the food more deeply into the lungs rather than toward the mouth. Poor dentition is a common risk factor for foreign body aspiration. Other risk factors include decreased mental status, neurologic disease, older age, and the use of sedative medication.

- 96** Answer A. The image demonstrates hemoperitoneum with blood in Morison's pouch (right upper quadrant). In an unstable patient, this is an indication for immediate laparotomy. In unmistakably stable patients, a CT scan of the abdomen should be performed to better delineate the injury and the potential need for surgery. The sensitivity of FAST for the detection of 100 to 500 mL of blood is as high as 95%. Therefore, while at least 500 mL of blood is present, it is not possible to state unequivocally that 2.5 L is present. Furthermore, 2.5 L of blood loss would place the average adult male in class IV hemorrhagic shock which typically presents with a systolic blood pressure <70 mm Hg and a heart rate >140. After confirming the presence of hemoperitoneum by ultrasonography, CT scanning should only be performed in undoubtedly stable patients if a clear reason for laparotomy does not already exist. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:694.)

- 97** Answer D. Roughly 85% to 90% of cases are due to metastatic disease. Breast, prostate, and lung cancer each account for 15% to 20% of cases. The most common site of metastases is the thoracic spine (60%), followed by the lumbosacral spine (30%). Although central disk herniation may result in cauda equina syndrome (CES), only 2% of patients with central lumbar disk herniation typically develop CES. Epidural abscess is a rare entity and most commonly occurs in intravenous drug users. *S. aureus* is the typical causal organism

and the infection usually involves multiple spinal segments. Epidural hematoma is another extremely rare entity that may complicate lumbar puncture in patients with a coagulopathy. Myelitis, also known as *transverse myelitis*, is a rare inflammatory disorder that is intrinsic to the spinal cord although it may be mimicked by epidural compression. Its exact cause is not known although it is thought to follow a viral syndrome in roughly 30% of patients.

- 98** Answer C. The patient has nearly complete opacification of the left lung. In trauma patients who are usually supine, this indicates a large hemothorax, as blood will layer through gravity throughout the entire lung field. Treatment involves tube thoracostomy drainage and possible thoracotomy if the exsanguination is rapid or severe. Pneumothorax may be concomitant but is not evident on this chest x-ray. Pericardial tamponade is best diagnosed by FAST scan. Pneumoperitoneum is not evident—air under the left diaphragm is much more likely to be a physiologic gastric bubble. Diaphragmatic rupture would be indicated by abdominal organ herniation into the thorax which is not evident. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:637.)
- 99** Answer E. Posterior wall MIs occur with infarction of the right coronary artery or left circumflex artery, depending on the anatomic dominance of the patient. Standard EKG electrodes are anteriorly placed and may not exhibit infarction patterns of ST elevation—posterior electrodes are more accurate at diagnosing posterior wall MIs. Infarction patterns in posterior wall MIs are opposite of those in anterior wall MIs—posterior MIs will show ST depression instead of ST elevation, R waves instead of Q waves, and upright T waves instead of T-wave inversions. Leads V1 and V2 are the most specific anterior leads for posterior wall infarction. Tall R waves, like Q waves, are the latest findings in posterior MIs.
- 100** Answer C. Munchausen's syndrome by proxy refers to the intentional faking or production of illness of a child by a caregiver. Virtually any type of illness is simulated by the caregiver in order to attain medical attention evaluation. The vast majority of caregivers who perpetrate Munchausen's syndrome by proxy are biologic mothers, usually with a history of mood disorder or prior abuse. Fathers and nonparent guardians are much less likely to be involved. The victims are usually young children without gender predominance.



Test 8

Questions

- 1 Which of the following is true regarding temporomandibular joint (TMJ) syndrome?
- (A) It is an extremely rare cause of facial pain.
 - (B) Young women are at highest risk.
 - (C) Pain is normally bilateral.
 - (D) Muscle relaxants are not helpful in management.
 - (E) Avoidance of hard foods is rarely necessary.
- 2 A patient presents with the electrocardiogram (EKG) shown in Figure 8-1. Which of the following is the most likely pathophysiologic mechanism?
- (A) Reentry
 - (B) Increased automaticity
 - (C) Atrioventricular (AV) blockade
 - (D) Preexcitation
 - (E) Infarction
- 3 Which of the following is the drug of choice for the prevention of future cluster headache attacks?
- (A) Lithium
 - (B) Verapamil
 - (C) Valproate
 - (D) Topiramate
 - (E) Sumatriptan
- 4 What is the most common cause of death in patients with hemophilia A?
- (A) Septic shock
 - (B) Myocardial infarction (MI)
 - (C) Gastrointestinal bleeding
 - (D) Intracranial hemorrhage
 - (E) Congestive heart failure

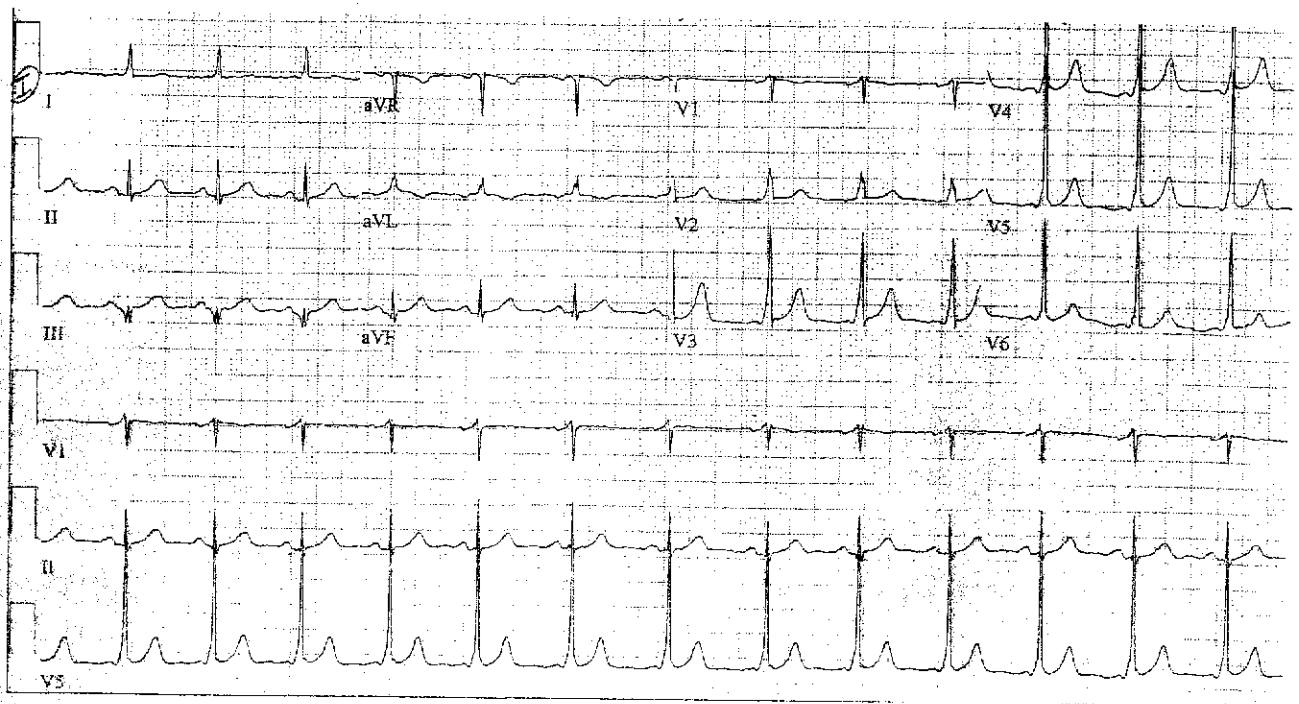


Figure 8-1.

- 5 Which of the following results from a lesion within the pons?
- (A) Ipsilateral oculomotor nerve palsy with contralateral hemiparesis.
 - (B) Upward gaze paralysis with torsional nystagmus.
 - (C) Ipsilateral facial droop with contralateral hemiparesis.
 - (D) Ipsilateral lateral gaze palsy with ipsilateral hemiparesis.
 - (E) Deviation of the tongue away from the lesion and contralateral hemiparesis.
- 6 Patients with botulism most classically present with which of the following?
- (A) Ascending symmetric anesthesia.
 - (B) Nausea, vomiting, and lower extremity weakness within 1 to 2 hours of toxin exposure.
 - (C) Descending symmetric paralysis.
 - (D) Anticholinergic symptoms of constipation, dry skin, dry eyes, and urinary retention.
 - (E) Altered mental status.
- 7 Which of the following is an indication for antibiotic prophylaxis in patients with prosthetic heart valves?
- (A) Endoscopic retrograde cholangiopancreatography (ERCP)
 - (B) Endotracheal intubation
 - (C) Vaginal delivery
 - (D) Dilation and curettage
 - (E) Local anesthesia
- 8 The family of a 49-year-old woman with a history of hypertension brings her to the emergency department (ED) with a chief complaint of mumbled, incomprehensible speech that started approximately 5 hours ago along with weakness of her right arm, leg, and face. Computed tomography (CT) of her head reveals an area of infarction in her left hemisphere but no evidence of bleeding. Upon returning from CT, the nurse tells you her blood pressure is 200/105. Which of the following summarizes the best approach to managing this patient's blood pressure?
- (A) Start a sodium nitroprusside drip and titrate to a systolic blood pressure (SBP) of 160 mm Hg.
 - (B) Give the patient her oral antihypertensive medications at her usual doses.
 - (C) Administer 5 to 10 mg of labetalol IV every 10 to 20 minutes until the patient's SBP is between 140 and 160 mm Hg.
 - (D) Give the patient 60 mg of nimodipine PO because of its dual effects in lowering blood pressure and in preventing vasospasm.
 - (E) Continue to monitor the patient's blood pressure without treatment.
- 9 A 34-year-old man with schizophrenia is brought to the ED by his family because he "keeps ignoring" them. They report that for the last few hours, when they argue with him about taking his risperidone, he stares off into space and does not acknowledge them in any way. This lasts for a few minutes and gradually improves until the next conversation. They want to speak with the psychiatrist about putting him on a new antipsychotic medication. His vital signs are normal and physical examination is unremarkable except that when you question him about his medication, he becomes visibly angry and his eyes look up to the ceiling. After he calms down in a few minutes, he resumes normal eye contact and conversation. Which of the following is the most appropriate action at this time?
- (A) Discharge home with outpatient psychiatry follow-up
 - (B) Consult psychiatry for alprazolam prescription
 - (C) Haloperidol 5 mg IM
 - (D) Lorazepam 2 mg IM
 - (E) Benztropine 1 mg IM
- 10 Which of the following laboratory abnormalities may be seen in patients with hyperemesis gravidarum?
- (A) Hyperkalemia
 - (B) Elevated liver enzymes
 - (C) Thrombocytopenia
 - (D) Hyperglycemia
 - (E) Elevated erythrocyte sedimentation rate
- 11 A 67-year-old woman with a history of hyperlipidemia, coronary artery disease, and hypertension is brought in by emergency medical services (EMS) after developing acute vertigo, ataxia with a tendency to veer to the left, nausea, and vomiting. She has had no tinnitus or decreased hearing. On examination, you find her to be mildly dysarthric, and unable to stand or walk due to imbalance. Her right arm is very clumsy but her left arm appears to be normal. Her family tells you that she does not normally have problems with balance but that she had an acute fall without loss of consciousness approximately 2 weeks ago. What do you expect to see on her head CT?
- (A) Right parietal lobe infarction
 - (B) Right cerebellar infarction
 - (C) Lacunar infarcts of the basal ganglia
 - (D) Large left hemispheric infarct
 - (E) Right basal ganglia infarction
- 12 Which of the following is true regarding pulsus paradoxus (PP)?
- (A) Tension pneumothorax is the most common extracardiac cause of PP.

- (B) The presence of a PP of up to 15 mm Hg is considered normal.
- (C) The "paradox" refers to the fact that heart sounds are heard when at the same time no peripheral pulse is felt.
- (D) Patients with severe asthma exacerbations rarely have a widened PP.
- (E) None of these are true.
- 13** Which of the following is true regarding lipase and amylase in the setting of acute pancreatitis?
- (A) Lipase is more specific than amylase.
- (B) Amylase is more sensitive than lipase.
- (C) Amylase peaks earlier and remains elevated for a longer period than lipase.
- (D) The degree of elevation of either amylase or lipase correlates with disease severity.
- (E) The amylase to lipase ratio may be useful in determining the etiology of pancreatitis.
- 14** Which of the following is true about gastric volvulus?
- (A) It is usually associated with a large umbilical hernia.
- (B) It most commonly results from twisting about its short axis from the greater to the lesser curvature of the stomach.
- (C) It most commonly occurs in infants younger than 1 year.
- (D) In most cases, a nasogastric tube cannot be passed into the stomach.
- (E) Gastric infarction and death occur in 80% of patients if not rapidly diagnosed and treated.
- 15** Most cases of pseudogout are
- (A) Due to hyperparathyroidism.
- (B) Due to hemochromatosis.
- (C) Due to hypomagnesemia.
- (D) Due to hypothyroidism.
- (E) Idiopathic.
- 16** A 62-year-old woman with a history of known peptic ulcer disease presents with a chief complaint of hematemesis and black tarry stools. Her vital signs include a pulse of 105 and an systolic blood pressure (SBP) of 115 mm Hg. She has no history of hypertension. Her initial hemoglobin is 9.6 g per dL. Which of the following is most likely to be useful in this patient?
- (A) Continuous famotidine infusion
- (B) Sengstaken-Blakemore tube placement
- (C) Ewald tube placement
- (D) Continuous octreotide infusion
- (E) Continuous pantoprazole infusion
- 17** A 4-week-old male infant is brought in by his parents with progressive, projectile, and nonbilious emesis. Labs are drawn and an IV is placed and the patient is sent for an ultrasonograph. Ultrasonography reveals a hypertrophic pylorus and the surgeon is consulted for pyloric stenosis. What are the labs likely to reveal?
- (A) A hypochloremic, eukalemic, and metabolic acidosis
- (B) A compensatory respiratory alkalosis
- (C) A hypochloremic, hypokalemic, metabolic alkalosis
- (D) A hyperchloremic, hyperkalemic, metabolic acidosis
- (E) A high anion gap metabolic acidosis
- 18** A 56-year-old man with long-standing hypertension and mild renal insufficiency presents to the ED with vague complaints of fatigue and generalized malaise. His EKG is shown in Figure 8-2. Which of the

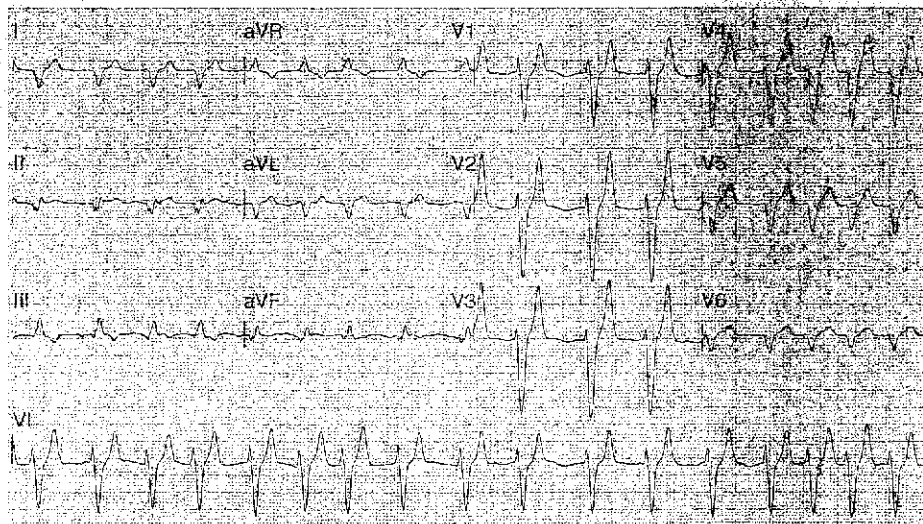


Figure 8-2.

- following is the next best step in management of this patient?
- (A) Nebulized albuterol
 - (B) Insulin
 - (C) Calcium chloride
 - (D) Sodium polystyrene sulfate (Kayexalate)
 - (E) Furosemide
- 19 A 35-year-old patient is brought to the ED by his parents for evaluation of psychiatric illness. Which of the following is an indication for hospital admission on psychiatric grounds?
- (A) Past medical history of schizophrenia
 - (B) Past medical history of major depression
 - (C) Acute ethanol intoxication
 - (D) Homicidal ideation
 - (E) Major depressive episode without suicidal ideation
- 20 Which of the following correctly matches the vasculitic syndrome to its primary clinical manifestations?
- (A) Polyarteritis nodosa (PAN) and peripheral neuropathy and bowel ischemia
 - (B) Takayasu's arteritis and oral and genital ulcerations
 - (C) Wegener's granulomatosis and cardiac ischemia
 - (D) Behçet's disease and sinusitis, otitis and nasal congestion
 - (E) Churg-Strauss syndrome and glomerulonephritis
- 21 In a human immunodeficiency virus (HIV) positive patient with *Pneumocystis carinii* pneumonia (PCP) who has a sulfa allergy precluding the use of trimethoprim-sulfamethoxazole (TMP-SMX), which of the following is the best outpatient regimen?
- (A) Primaquine plus clindamycin
 - (B) Levofloxacin
 - (C) Albendazole plus trimethoprim
 - (D) Pentamidine
 - (E) Doxycycline
- 22 Which of the following is true regarding traumatic aortic injury (TAI)?
- (A) Dyspnea is the most common symptom.
 - (B) Normal chest x-ray rules out the diagnosis.
 - (C) CT aortography has better sensitivity than transthoracic echocardiogram.
 - (D) Blood pressure control is not useful in the preoperative setting.
 - (E) The ascending aorta is the site at highest risk for rupture.
- 23 In a normal singleton pregnancy, which of the following is true?
- (A) In cephalic presentations, the smallest possible presenting diameter occurs when the fetal head is maximally extended.
 - (B) Only fetuses with a longitudinal lie can be safely delivered vaginally.
 - (C) Position refers to the presenting fetal part that overlies the pelvis.
 - (D) Station refers to the distance of the fetal presenting part from the vaginal introitus.
 - (E) All of the above.
- 24 Among adults, which of the following is the most common cause of acute diarrheal illness in the United States?
- (A) Viruses
 - (B) *Escherichia coli*
 - (C) *Campylobacter* spp.
 - (D) *Giardia lamblia*
 - (E) *Staphylococcus aureus*
- 25 Which of the following is the most effective method of eliminating symptoms in acquired immune deficiency syndrome (AIDS) patients with *Cryptosporidium* diarrhea?
- (A) Loperamide
 - (B) Highly active antiretroviral therapy (HAART)
 - (C) Azithromycin
 - (D) Metronidazole
 - (E) Octreotide
- 26 Which of the following is true regarding liver abscesses?
- (A) Pyogenic liver abscesses are more common than amebic liver abscesses.
 - (B) Most cases of pyogenic liver abscesses occur as a consequence of untreated appendicitis.
 - (C) Most cases of pyogenic liver abscesses are caused by a single organism.
 - (D) Biliary disease is uncommon in patients with pyogenic liver abscesses.
 - (E) None of the above.
- 27 A 45-year-old woman with a history of untreated hyperthyroidism presents with acute onset of left foot pain. Physical examination reveals normal vital signs, an irregular heart rhythm, clear lung sounds, and loss of pulses in the left foot with decreased capillary refill, and cyanotic, paralyzed toes. Which of the following is the most appropriate next step in management?
- (A) Anticoagulation and emergent embolectomy
 - (B) Anticoagulation and emergent bypass surgery

- (C) Anticoagulation alone
 - (D) Lumbar sympathectomy
 - (E) Hyperbaric oxygen therapy
- 28** Which of the following toxins is most commonly associated with seizures?
- (A) Cocaine
 - (B) Alcohol
 - (C) Opiates
 - (D) Ecstasy
 - (E) Ephedra
- 29** Which of the following is true regarding the physical examination of a patient with asthma?
- (A) Cyanosis is a common finding.
 - (B) Respiratory rate correlates poorly to the severity of an asthma exacerbation.
 - (C) Pulsus paradoxus (PP) is present in 90% of patients with severe asthma.
 - (D) Patients with refractory severe asthma who progress to status asthmaticus have increasingly audible wheezing.
 - (E) Accessory muscle use is typically present in mild asthma exacerbations.
- 30** A 47-year-old woman without any past medical history presents with several days of progressively worsening left eye pain, blurry vision, and redness. Visual acuity in the left eye is slightly reduced. The patient notes that exposure of the right eye to light causes increased pain in her left eye. Her left pupil is constricted and minimally reactive to light with perilimbic conjunctival injection. There is no discharge. Which of the following is the most appropriate treatment?
- (A) Topical antibiotics
 - (B) Hypertonic eye drops
 - (C) IV mannitol
 - (D) Ocular massage
 - (E) Topical cycloplegic mydriatics
- 31** Which of the following is the most common cause of death in patients with sickle cell disease?
- (A) Myocardial Infarction (MI)
 - (B) Stroke
 - (C) Sepsis
 - (D) Aplastic crisis
 - (E) Splenic sequestration
- 32** Which of the following is true regarding traumatic iridocyclitis?
- (A) It is generally painless.
 - (B) Findings include a fixed and dilated pupil.
 - (C) Treatment involves long-acting cycloplegics.
 - (D) Steroids play no role in management.
 - (E) Resolution generally occurs 1 month after the onset of symptoms.
- 33** The most common cause of immediate postpartum hemorrhage is
- (A) Retained products of conception.
 - (B) Vaginal or vulvar tears.
 - (C) Uterine atony.
 - (D) Placenta accreta.
 - (E) Uterine rupture.
- 34** A 35-year-old man presents with severe head injury after being struck in the head with a baseball bat. His field vital signs are: HR 135, BP 82/45, RR 20. Which of the following is the most likely cause of his hypotension?
- (A) Epidural hematoma
 - (B) Subdural hematoma
 - (C) Subarachnoid hemorrhage (SAH)
 - (D) Cerebral contusion
 - (E) Extracranial cause
- 35** Which of the following is true regarding urine analysis?
- (A) Urine dipstick is 99% sensitive for microscopic hematuria.
 - (B) Red blood cell (RBC) casts indicate interstitial cystitis.
 - (C) White blood cell casts indicate renal parenchymal inflammation.
 - (D) Transitional cells indicate bladder cancer.
 - (E) Normal urinary pH is 9–11.
- 36** Which of the following is true regarding rheumatoid arthritis (RA)?
- (A) The distal interphalangeal (DIP) joints are commonly affected.
 - (B) Arthritis is commonly polyarticular and asymmetric.
 - (C) Fifteen percent of patients will have a negative rheumatoid factor (RF).
 - (D) The disease is equally common in women and in men.
 - (E) Arthritic involvement of the spine is uncommon in RA.
- 37** A 24-year-old man came to the ED with dyspnea and pleuritic chest pain for 10 days, complaining that his breathing is getting worse. You are surprised to find a 40% right sided pneumothorax and you immediately place a chest tube, connecting it to wall suction. Although the patient initially improved,

1 hour later he began coughing vigorously, and he appears tachypneic and dyspneic. Assuming he has not experienced a recurrence or worsening of his pneumothorax, what is the most likely cause of his problem?

- (A) Hemothorax caused by intercostal artery laceration
- (B) Development of an empyema
- (C) Asthma exacerbation triggered by the procedure
- (D) Reexpansion pulmonary edema (REPE)
- (E) Pulmonary embolism (PE)

38 Which of the following is the average duration of a typical generalized tonic-clonic seizure?

- (A) 15 seconds
- (B) 30 seconds
- (C) 1 minute
- (D) 2 minutes
- (E) 3 minutes

39 A 55-year-old patient presents with palpitations for 1 week. The EKG done in the primary care doctor's office is shown in Figure 8-3. The patient is sent to the emergency room (ER) for further evaluation. Which of the following is the most appropriate next step in management?

- (A) Diltiazem 20 mg IV
- (B) Esmolol 50 μ g/kg/minute IV
- (C) Enoxaparin 1 mg per kg SC

- (D) Amiodarone 150 mg IV
- (E) Adenosine 6 mg IV

40 An 85-year-old woman presents with a painless mass in the right side of her neck. She first noticed the mass while brushing her teeth 3 days ago, but waited to see if it would go away before seeking medical attention. She has had pain in her right ear for the last week. She denies fevers, weight loss, foreign travel, night sweats, or history of smoking. She also denies dysphagia, odynophagia, stridor, or globus. On examination, the patient has a 4 \times 2 cm firm, immobile, nontender mass just lateral to her right sternocleidomastoid muscle at the level of her thyroid cartilage. Her right tympanic membrane is retracted with a serous effusion. What is the most likely diagnosis?

- (A) Viral lymphadenitis
- (B) Bacterial lymphadenitis
- (C) Acute otitis media with reactive lymphadenitis
- (D) Benign neoplasia
- (E) Malignancy

41 Which of the following is associated with a normal anion gap in overdose?

- (A) Salicylates
- (B) Methanol
- (C) Isopropanol
- (D) Ethylene glycol
- (E) Isoniazid

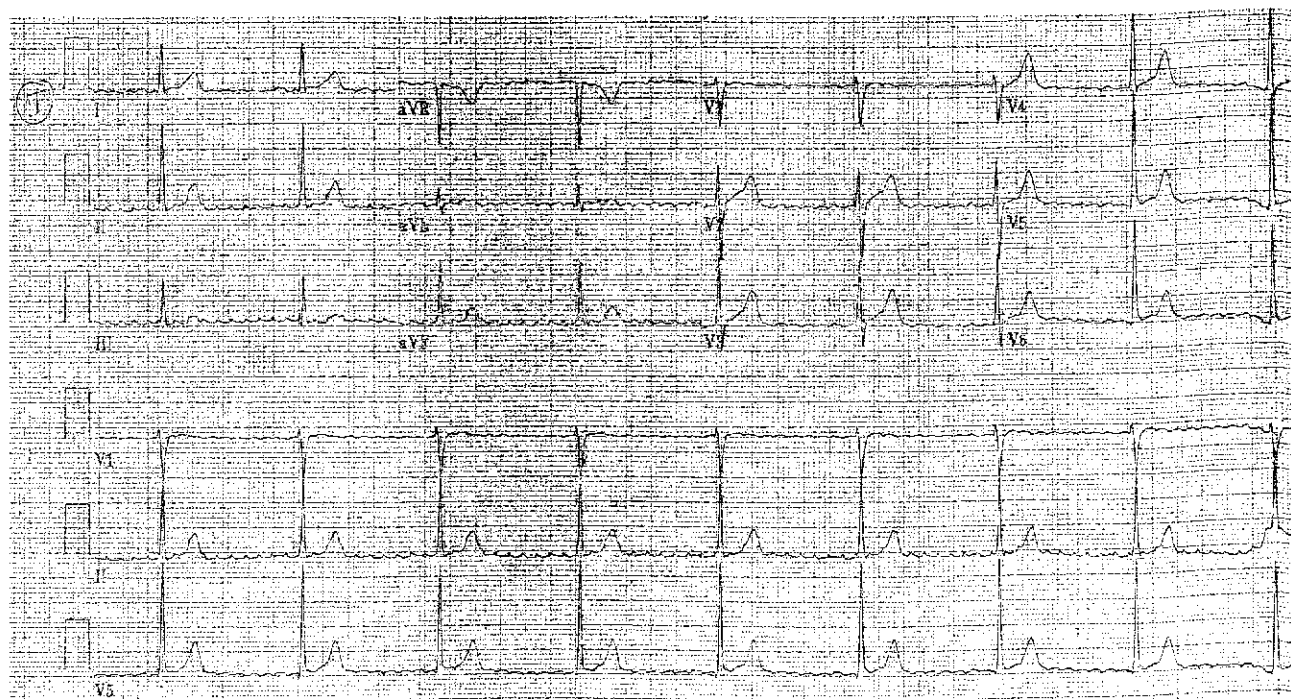


Figure 8-3. (See color insert.)

- 442 Which of the following is true regarding the diagnosis of aortic dissection?
- (A) Magnetic resonance imaging (MRI) is more specific than CT or transesophageal echocardiogram.
 - (B) Chest x-ray is normal in most cases.
 - (C) Transthoracic echocardiogram is useful to confirm the diagnosis.
 - (D) Aortography is the best screening test.
 - (E) EKG has excellent specificity.
- 443 Which of the following is true regarding ibuprofen overdoses?
- (A) Rapid progression to coma and death often occurs within 24 hours.
 - (B) Significant morbidity and mortality is prevented by timely administration of a specific antidote.
 - (C) Hemodialysis is required in approximately half the cases.
 - (D) Urinary alkalization is effective at reducing toxicity.
 - (E) Even without treatment, a benign course is characteristic.
- 444 Which of the following statements about joint pathology is true?
- (A) Viscosity of synovial fluid increases in inflammatory or infectious arthritis.
 - (B) Osteoarthritis (OA) classically affects the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints.
 - (C) A cardiac rub in the setting of arthralgias suggests systemic lupus erythematosus (SLE).
 - (D) Sausage-shaped swelling of the fingers or toes suggests pseudogout.
 - (E) An abducted, externally rotated hip in a neonate suggests an occult hip fracture.
- 445 Which of the following is the most appropriate medication to induce rapid, measured reduction of blood pressure in hypertensive crises?
- (A) Nifedipine
 - (B) Isoproterenol
 - (C) Phenoxybenzamine
 - (D) Nitroprusside
 - (E) Hydrochlorothiazide
- 446 Which of the following is the leading cause of legal blindness in the United States?
- (A) Cataracts
 - (B) Glaucoma
 - (C) Diabetic retinopathy
 - (D) Macular degeneration
 - (E) Retinal detachment
- 447 A 27-year-old nonpregnant woman presents with pelvic pain. Pelvic ultrasonography reveals a 4-cm right adnexal cystic mass. Which of the following is the most likely etiology?
- (A) Corpus luteum cyst
 - (B) Dermoid cyst
 - (C) Theca lutein cyst
 - (D) Follicular cyst
 - (E) Ovarian fibroma
- 448 Which of the following statements regarding foreign body aspiration is correct?
- (A) Most aspirated foreign bodies are radio-opaque.
 - (B) Children younger than 12 months more commonly have a delayed presentation.
 - (C) Most foreign bodies are aspirated into the trachea instead of the more distal airways.
 - (D) Obstructive emphysema is one of the most common radiologic findings.
 - (E) Persistent cough is the most predictive finding for foreign body aspiration.
- 449 The most common cause of pruritus ani is
- (A) Inadequate anal hygiene.
 - (B) Anal fissure.
 - (C) Hemorrhoids.
 - (D) Lichen sclerosus.
 - (E) Diabetes mellitus.
- 450 Which of the following is a possible complication of a peritonsillar abscess?
- (A) Spontaneous rupture and aspiration
 - (B) Airway obstruction
 - (C) Mediastinitis
 - (D) Ludwig's angina
 - (E) All of the above
- 451 A 35-year-old woman without any past medical history presents with a red, painful region on her right arm where she had a bug bite 3 days before. She denies fever. She is allergic to penicillin. Vital signs are normal. Physical examination is remarkable for a 10 x 6 cm² area on her right arm that is red, warm, tender, and sharply demarcated. There is no lymphangitic streaking or axillary lymphadenopathy. You diagnose her with cellulitis. Which of the following is the most appropriate choice of antibiotic?
- (A) Gentamicin
 - (B) Doxycycline

- (C) Dicloxacillin
- (D) Linezolid
- (E) Metronidazole

52 A 38-year-old woman who has a history of "infertility" presents to the ED with low abdominal pain. She recently became pregnant after using *in vitro* fertilization. Her physical examination reveals mild low abdominal tenderness, no adnexal mass, and a closed cervical os with a normal bimanual examination. An ultrasonography demonstrates a live intrauterine gestation appropriately sized for dates, but also reveals a slightly enlarged left ovary. Which of the following is the approximate risk of a heterotopic pregnancy in this patient?

- (A) 0.25%
- (B) 1%
- (C) 10%
- (D) 25%
- (E) 50%

53 A 44-year-old alcoholic man presents with nausea and vomiting. He reports drinking alcohol for 2 days straight. Physical examination is normal except for a mildly intoxicated patient with extremely dry mucous membranes. Urine dip is positive for ketones. The chemistry panel is as given:

Na⁺ 134 mEq per L
K⁺ 4.0 mEq per L
Cl⁻ 92 mEq per L
HCO₃⁻ 18 mEq per L
BUN 32 mg per dL
Cr 1.6 mg per dL
Glu 114 mg per dL

Which of the following is the most appropriate next step in management?

- (A) Bicarbonate
- (B) Insulin
- (C) Glucose
- (D) Potassium
- (E) Magnesium

54 The most commonly injured ligament during ankle sprains is

- (A) Anterior talofibular.
- (B) Calcaneofibular.
- (C) Posterior talofibular.
- (D) Anterior inferior tibiofibular.
- (E) Deltoid.

55 Which of the following x-ray findings is diagnostic for pulmonary embolism (PE)?

- (A) Atelectasis
- (B) Hampton's hump (pleural wedge density)
- (C) Elevated hemidiaphragm



Figure 8-4.

- (D) Westermark's sign (oligemia)
- (E) None of the above

56 A 25-year-old woman presents with the following injury while playing with darts. Which of the following is the most appropriate next step in management (see Fig. 8-4)?

- (A) Measurement of intraocular pressure
- (B) Removal of foreign body
- (C) Slit lamp examination
- (D) Emergent MRI
- (E) Intravenous antibiotics

57 Which of the following personality disorders is seen in most patients with somatization disorder?

- (A) Histrionic
- (B) Antisocial
- (C) Schizoid
- (D) Schizotypal
- (E) Narcissistic

58 A 38-year-old woman presents to the ED with a complaint of extreme hand and finger pain, which she says is exacerbated any time her fingers are exposed to the cold. She first noticed the problem when reaching into the freezer to grab a frozen dinner. She notes that her fingers become "ghost white" or blue at the tips and have a painful ache. Which of the following is the most common underlying disorder that produces these symptoms?

- (A) Systemic lupus erythematosus (SLE)
- (B) rheumatoid arthritis (RA)
- (C) Scleroderma
- (D) Polyarteritis nodosa (PAN)
- (E) Inflammatory bowel disease

59 A 55-year-old woman presents with uncontrollable twisting movements of her face and tongue. She has

been on an antipsychotic for 25 years for treatment of schizophrenia. Which of the following is true regarding this condition?

- (A) Patients with concomitant depression are at higher risk.
 - (B) Symptoms usually start within the first week of treatment.
 - (C) It is 100% reversible if the medication is stopped.
 - (D) Young men are the highest risk group.
 - (E) Treatment with anticholinergics is usually successful.
- 60** A 9-month-old boy is brought by his parents for evaluation of abdominal mass that they noticed while changing him. Physical examination demonstrates a nontoxic, active infant with a palpable, nontender mass measuring 4 × 6 cm several centimeters to the right of and cephalad to the umbilicus. Which of the following studies is most likely to reveal the diagnosis?
- (A) Gall bladder ultrasonography
 - (B) Scrotal ultrasonography
 - (C) Renal ultrasonography
 - (D) Urinalysis
 - (E) Meckel's scan
- 61** The approximate mortality from subarachnoid hemorrhage (SAH) is which of the following?
- (A) 5%
 - (B) 15%
 - (C) 30%
 - (D) 50%
 - (E) 75%
- 62** Which of the following is true regarding herpes simplex encephalitis?
- (A) Bilateral frontal lobe involvement is characteristic.
 - (B) HSV-2 is the most common cause in adults.
 - (C) Acyclovir reduces mortality.
 - (D) Most patients recover without neurologic sequelae.
 - (E) The sensitivity of cerebrospinal fluid (CSF) culture is 90%.
- 63** Which of the following is used in addition to acetaminophen concentration to determine severity in overdose?
- (A) Lipase
 - (B) Amylase
 - (C) Gamma Glutamyl Transpeptidase (GGT)
 - (D) Aspartate aminotransferase (AST)
 - (E) Alkaline phosphatase

- 64** Which of the following is the most common mechanism of trauma in the elderly?
- (A) Falls
 - (B) Motor vehicle collisions (MVCs)
 - (C) Gunshot wounds
 - (D) Stab wounds
 - (E) Elder abuse
- 65** Which of the following is associated with cystitis in adults?
- (A) Hematuria
 - (B) Flank pain
 - (C) Fever
 - (D) Chills
 - (E) Vomiting
- 66** Which of the following is indicated as supplemental treatment for patients with ethylene glycol poisoning?
- (A) Folate and niacin
 - (B) Thiamine and pyridoxine
 - (C) Vitamin D and vitamin K
 - (D) Cobalamin and vitamin A
 - (E) Potassium and selenium
- 67** Which of the following is true regarding topical ophthalmic antibiotics?
- (A) Ointments have a shorter duration of action than drops.
 - (B) Ointments are absorbed more rapidly than drops.
 - (C) Systemic side effects may occur.
 - (D) Drops are preferred in pediatric patients.
 - (E) Antibiotics should not be prescribed for conjunctivitis without positive cultures.
- 68** Which of the following is a common cause of death in patients with acute renal failure?
- (A) Hypercalcemia
 - (B) Hyperkalemia
 - (C) Hypermagnesemia
 - (D) Hyponatremia
 - (E) Hyperphosphatemia
- 69** Which of the following associations is true?
- (A) Mallet finger: Disruption of the flexor digitorum profundus (FDP) tendon.
 - (B) Bennett fracture: Extra-articular fracture of the base of the thumb metacarpal.
 - (C) Trigger finger: Volar plate entrapment.
 - (D) Jersey finger: Primary involvement of the ring finger.
 - (E) Garrekeper's thumb: Radial collateral ligament injury.

- 70 A 19-year-old woman is brought to the ED after an accidental submersion. She was drinking with friends at a dock when she accidentally fell into the water. She was submerged in the water for approximately 1 minute before her friends pulled her out. She was gagging and coughing when they pulled her from the water but she did not require cardiopulmonary resuscitation (CPR). Her blood alcohol level is 120 mg per dL and her pulse oximetry reveals an oxygen saturation of 94% on room air. An initial chest x-ray is normal. Assuming the remainder of her examination is normal and she has no signs of trauma, the best course of management is
- (A) Admission to the hospital for overnight observation.
 - (B) Observation for 4 hours, then discharge if she is asymptomatic with $\text{Sao}_2 > 94\%$ on room air.
 - (C) Repeat chest x-ray in 6 hours, then discharge if she is asymptomatic with $\text{Sao}_2 > 94\%$ on room air.
 - (D) Administer oral steroids and prescribe a short pulse of steroids to limit aspiration pneumonitis and discharge home without observation.
 - (E) Administer oral antibiotics and oral steroids, prescribe a course of both medicines, and discharge home without observation.
- 71 Which of the following physiologic changes is expected in hypothermic patients?
- (A) Hemoconcentration
 - (B) Hypoglycemia
 - (C) Metabolic alkalosis
 - (D) Oliguria
 - (E) Seizures
- 72 Which of the following is true regarding the management and prognosis of trigeminal neuralgia?
- (A) Remission, with or without treatment, rarely occurs.
 - (B) Antitherpes virus medications and corticosteroids have been shown to reduce the duration of pain and prevent recurrence.
 - (C) In addition to medical treatment, all patients should be referred to a neurologist for further evaluation by MRI.
 - (D) Fifty percent of patients will eventually require neurosurgical ablation of the trigeminal nerve.
 - (E) All patients should be loaded with phenytoin and prescribed an outpatient regimen.
- 73 A 65-year-old man presents with acute onset of back pain and bilateral leg weakness. He was just diagnosed with prostate cancer on a recent biopsy and has not seen his oncologist yet. Physical examination demonstrates 3/5 strength in both of his lower extremities and tenderness to palpation of his lower back. An emergent MRI demonstrates epidural lumbar spinal cord compression secondary to metastasis. Which of the following is the most appropriate initial consultation for the emergency physician (EP) to initiate?
- (A) Radiation oncology
 - (B) General surgery
 - (C) Urology
 - (D) Neurology
 - (E) Physical medicine and rehabilitation
- 74 A 22-year-old woman presents with cyanosis. She complains of shortness of breath, headache, and slurred speech. Her friends report that she was using "some medicine," to get high, but cannot recall the exact one. Pulse oximetry is 85% despite aggressive oxygen therapy. Blood drawn from the patient appears extremely dark. Which of the following is the most likely drug ingested?
- (A) Lorazepam
 - (B) Dextromethorphan
 - (C) Amyl nitrate
 - (D) Diphenhydramine
 - (E) Ketamine
- 75 Which of the following is the most common complication of mitral stenosis (MS)?
- (A) Atrial fibrillation
 - (B) Endocarditis
 - (C) Congestive heart failure
 - (D) Myocardial infarction (MI)
 - (E) Pneumonia
- 76 Which of the following is true regarding lung abscesses?
- (A) The most common pathogen is *Streptococcus pneumoniae*.
 - (B) Patients with anaerobic lung abscesses typically present with acute-onset chest pain, cough, and fever.
 - (C) Lung abscess occurs most commonly in patients with poor oral hygiene.
 - (D) Thoracotomy with abscess excision is the cornerstone of therapy.
 - (E) Lung abscesses most commonly develop as a complication of pediatric pneumonia.
- 77 Hyponatremia . . .
- (A) Almost never occurs in alert patients with an intact thirst mechanism.
 - (B) May occur after administration of single doses of charcoal.

- (C) Is most commonly due to increased body stores of sodium (or sodium gain).
- (D) Is best treated with normal saline.
- (E) May result in central pontine myelinolysis if not treated within 72 hours.
- 78** Which of the following is the most common cause of hypercalcemia?
- (A) Malignancy
- (B) Paget's disease
- (C) Hyperparathyroidism
- (D) Adrenal insufficiency
- (E) Thiazide therapy
- 79** Which of the following patients is at increased risk for developing cellulitis?
- (A) A 27-year-old intravenous drug abuser who is engaging in "skin popping."
- (B) A 46-year-old diabetic man.
- (C) A 60-year-old woman with a history of left-sided mastectomy.
- (D) A 53-year-old man who is status postcoronary artery bypass grafting with a saphenous vein graft.
- (E) All of the above.
- 80** Which of the following is true regarding rust rings?
- (A) Removal should be undertaken immediately by the EP.
- (B) They are usually caused by copper-containing foreign bodies.
- (C) Topical steroids should be used for treatment.
- (D) MRI is indicated to evaluate for intraocular foreign bodies.
- (E) Ophthalmology follow-up should occur within 48 hours.
- 81** A 75-year-old man with history of atrial fibrillation presents with fatigue, nausea, and halos in his vision. He states that he has been depressed lately and took some pills in an effort to commit suicide. A serum digoxin level is elevated. Which of the following is an indication to administer digitalis antibody (Fab) fragments?
- (A) Atrial fibrillation with ventricular rate of 120
- (B) Potassium level of 6 mEq per L
- (C) Digoxin level of 3 ng per mL
- (D) Total digoxin ingestion of 3 mg
- (E) Magnesium level of 3 mEq per L
- 82** A 19-year-old man presents with fevers, chills, malaise, and rash for 5 days. He recently returned from a camping trip. The rash is macular and located on the wrists, ankles, palms, and soles. Routine laboratory work including lumbar puncture is normal. Which of the following is the most appropriate medication at this time?
- (A) Penicillin G
- (B) Doxycycline
- (C) Acyclovir
- (D) Clindamycin
- (E) Trimethoprim-sulfamethoxazole (TMP-SMX)
- 83** A 44-year-old cancer patient, with known chemotherapy-induced neutropenia is sent by her oncologist to the ED with a fever of 101.5°F. Which of the following is the most appropriate initial empiric antibiotic regimen?
- (A) Doxycycline
- (B) Cefepime
- (C) Clindamycin
- (D) Metronidazole + gentamicin
- (E) Metronidazole + aztreonam
- 84** You suspect that a lumbar puncture you performed to evaluate for subarachnoid hemorrhage (SAH) is a "traumatic tap." Which of the following cerebrospinal fluid (CSF) findings is most reliable for differentiating a SAH from a traumatic lumbar puncture?
- (A) A relative CSF leukocytosis will be present in cases of SAH.
- (B) The presence of xanthochromia indicates a SAH.
- (C) A twofold or greater decrease in the number of RBCs from tube 1 to tube 4 is always due to a traumatic tap.
- (D) A positive CSF clotting assay is consistent with a traumatic tap.
- (E) All of the above are equally useful.
- 85** Which of the following laboratory tests is most likely to be normal in patients with acute disseminated intravascular coagulation (DIC)?
- (A) Prothrombin time (PT)
- (B) Partial thromboplastin time (PTT)
- (C) Platelet count
- (D) Hemoglobin
- (E) Fibrinogen
- 86** Which of the following joints is most commonly affected in septic arthritis?
- (A) Hip
- (B) Knee
- (C) Ankle
- (D) Wrist
- (E) Shoulder
- 87** A 35-year-old man presents with progressively worsening severe right leg pain and swelling after

being kicked while playing soccer 3 days ago. Physical examination of his leg demonstrates firm, tender compartment of his right anterior leg with diminished sensation in the area. Pulses in the foot are 2+. You suspect compartment syndrome, so you call the orthopedist for consultation. He says that if pulses are present, it cannot be compartment syndrome, and that you should send the patient home to follow-up in clinic in 1 week. Which of the following is the most appropriate course of action?

- (A) Have the patient follow-up in 1 week.
- (B) Have the patient follow-up in 2 days.
- (C) Get an MRI of the leg.
- (D) Check ankle/brachial index (ABI) and discharge patient if ABI >0.9.
- (E) Insist that the orthopedist come to see the patient.

88 A 23-year-old man presents with difficulty breathing, altered mental status, and a petechial rash. He suffered a leg fracture the previous day from being kicked in the leg in a fight. Which of the following is the most likely diagnosis?

- (A) Meningococcemia
- (B) Fat embolism
- (C) Pulmonary thromboembolism
- (D) Pneumothorax
- (E) Pneumonia

89 Which of the following populations has the lowest rate of otitis media?

- (A) Eskimos
- (B) Caucasians
- (C) Native Americans
- (D) African Americans
- (E) Native Alaskans

90 Bites from which of the following snakes would most likely result in respiratory failure and death?

- (A) Rattlesnake
- (B) Cottonmouth (water moccasin)
- (C) Coral snake
- (D) Copperhead snake
- (E) All of the above

91 Which of the following is a risk factor for developing otitis media?

- (A) Breast feeding
- (B) Parental smoking
- (C) Environmental allergies
- (D) Female gender
- (E) Age older than 5 years

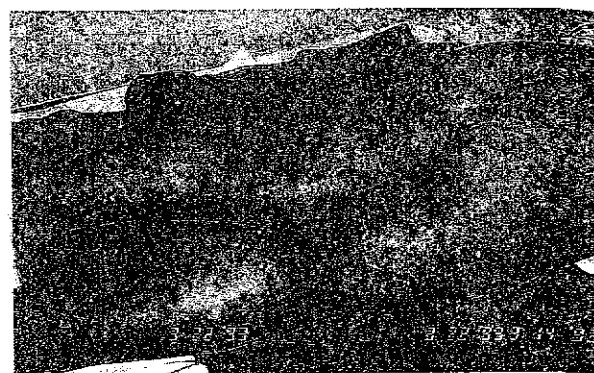


Figure 8-5. (See color insert.)

92 A mother brings in her 7-year-old daughter with a chief complaint of a rash, colicky abdominal pain, and achy ankles. The rash is palpable upon physical examination (see Fig. 8-5). Which of the following is true?

- (A) When present in adults, this tends to be a much more severe disease.
- (B) Her prognosis is primarily dependent on the presence of gastrointestinal bleeding.
- (C) Intussusceptions complicating this condition are most commonly ileocecal in location.
- (D) This patient should receive a short course of high dose intravenous corticosteroids.
- (E) None of the above.

93 Which of the following is true regarding renal injury in trauma?

- (A) In penetrating trauma, absence of hematuria rules out renal injury.
- (B) In blunt trauma, microscopic hematuria alone is rarely associated with renal injury.
- (C) Most renal injuries require operative repair.
- (D) Renal injuries are extremely uncommon in children with blunt trauma.
- (E) Plain radiography is the imaging test of choice for diagnosis.

94 Clinically significant hypermagnesemia almost always occurs in the setting of:

- (A) Renal insufficiency.
- (B) Pancreatitis.
- (C) Trauma.
- (D) Laxative abuse.
- (E) Alcoholism.

95 A 43-year-old alcoholic woman presents in coma. A relative states that the patient overdosed on her alprazolam, which she has been taking for many

years as an anxiolytic. After initial airway management and IV hydration, which of the following is the most appropriate next step in pharmacologic management?

- (A) Fomepizole
- (B) Flumazenil
- (C) Physostigmine
- (D) Glucagon
- (E) Thiamine

96 Possible complications of acute asthma exacerbations include all of the following except:

- (A) Pneumothorax.
- (B) Subconjunctival hemorrhage.
- (C) Subcutaneous emphysema.
- (D) Pulmonary embolus.
- (E) Myocardial infarction (MI).

97 A 35-year-old woman presents after a high-speed motor vehicle collision (MVC). She was unrestrained and there was considerable damage to the vehicle. She complains of chest pain and right leg pain. Paramedics report that the right ankle is visibly deformed. The patient is brought in on backboard and C-collar. Primary survey in the ED is intact, including present pulses and sensation in the deformed right ankle. Vital signs are: T 99.0 F, P 90, RR 22, BP 144/92, POx 95% RA. Which of the following is the most appropriate next step in management?

- (A) Chest x-ray
- (B) Lateral cervical spine x-ray
- (C) Right ankle x-ray
- (D) CT scan of the abdomen/pelvis
- (E) CT scan of the head

98 Which of the following findings may be present in hypothyroidism?

- (A) Nonpitting periorbital edema
- (B) Delayed relaxation phase of deep tendon reflexes
- (C) Median nerve neuropathy
- (D) Hypothermia
- (E) All of the above

99 An 8-year-old boy presents with wrist pain after a fall on his outstretched right hand. The x-ray is shown



Figure 8-6.

in Fig 8-6. Which of the following is the correct type of injury?

- (A) Salter-Harris I
- (B) Salter-Harris II
- (C) Salter-Harris III
- (D) Salter-Harris IV
- (E) Salter-Harris V

100 Which of the following is true regarding diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic syndrome or state (HHS)?

- (A) Fluid depletion is larger in DKA.
- (B) Seizures are the most common fatal manifestation in HHS.
- (C) All patients with HHS have potassium deficiency.
- (D) Thromboembolic events are more common in DKA.
- (E) All of the above.

Answers and Explanations

1 Answer B. Temporomandibular joint (TMJ) syndrome refers to a vague set of disorders involving the TMJ, such as pain, joint locking, and dislocation. It is considered the most common cause of facial pain after dentalgia. Young women comprise the highest risk category, and many patients have concomitant psychiatric conditions. The pain is normally unilateral. Evaluation involves imaging to assess for structural abnormalities and laboratory tests to check for associated systemic diseases such as rheumatoid arthritis (RA), degenerative joint disease, and ankylosis. Treatment is with nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, and a soft food diet during acute episodes to prevent further exercise of the muscles of mastication.

2 Answer D. The EKG demonstrates a preexcitation pattern. Leads V_1 through V_6 exhibit a gradual sloping of the QRS complex (delta wave) combined with a shortened PR interval. The most common type of preexcitation is Wolff-Parkinson-White (WPW) syndrome. Patients have an accessory conductive pathway from the atria to the ventricles which preexcites the ventricular myocytes before the AV node releases the normal sinoatrial depolarization. As a result, patients with WPW have a shortened PR interval and a delayed QRS upstroke, called the *delta wave*. Patients with WPW syndrome can have reentrant dysrhythmias, in which the accessory pathway can either conduct retrograde (in which the AV node conducts in the normal direction, producing a narrow QRS complex and an "orthodromic" pattern) or anterograde (in which the AV node conducts backwards, producing a wide QRS complex and an "antidromic" pattern). A patient with WPW syndrome, tachycardia, and wide QRS complexes suggests the presence of an antidromic conduction pattern (where the accessory pathway conducts anterograde and the AV node conducts retrograde). Selective AV nodal active agents are contraindicated in this circumstance, as inhibition of the AV node will cause faster conduction through the anterograde accessory pathway, which is already at high risk for degeneration into an unstable rhythm. The treatment of choice in stable antidromic or irregular tachycardias in patients with WPW is amiodarone or procainamide. Unstable patients require cardioversion.

3 Answer B. Verapamil is the drug of choice for prophylaxis of future cluster headaches. Corticosteroids

such as prednisone and dexamethasone may be used for short-term prophylaxis but verapamil is the drug of choice for long-term prevention of cluster headaches. Steroids are not used because of their poor side effect profile. In contrast, verapamil is well tolerated and has a benign side effect profile. Sumatriptan has been shown to be of no benefit in cluster headache prophylaxis, whereas topiramate has shown mixed results. Lithium and valproate have demonstrated some benefit in reducing future attacks, but because of their side effect profiles, they have limited use.

4 Answer D. Hemophilia A occurs with a genetic deficiency in factor VIII, predisposing the patient to hemorrhagic complications. The most common cause of death is from head trauma causing massive intracranial hemorrhage. Treatment of bleeding episodes in patients with hemophilia A is with factor VIII. Every patient with hemophilia A should receive factor VIII after head trauma (whether or not there is evidence of intracranial bleeding), as the risk of delayed bleeding is high. Sepsis and MI occur with similar incidence to the general population. Gastrointestinal bleeding does occur in hemophiliacs but is not as common a cause of morbidity or mortality as intracranial bleeding. Congestive heart failure may be secondary to high-output failure caused by anemia, but is usually a more chronic process and is not primarily responsible for death.

5 Answer C. The hallmark of lesions within the brainstem is the presence of "crossed signs." This refers to the occurrence of ipsilateral brainstem lesions with contralateral hemiparesis and hemisensory loss. The oculomotor nucleus is located in the midbrain, whereas the hypoglossal nucleus is located in the medulla. Therefore, neither of these nerves is affected by pontine lesions. Although the abducens nucleus is located within the pons, a pontine lesion resulting in ipsilateral lateral gaze palsy should be accompanied by contralateral hemiparesis. Of note, because brainstem lesions affect cranial nerve nuclei (or lower motor neurons of cranial nerves), such lesions result in a complete deficit in the distribution of the nerve. With respect to the facial nerve, this results in complete facial droop rather than the forehead sparing seen with cortical lesions (due to bilateral innervation of the facial nucleus).

- 6 Answer C. Botulinum toxin works by irreversibly binding to the presynaptic membrane of peripheral and cranial nerves where it inhibits the release of acetylcholine. The patient improves as new receptors are manufactured. Because the disorder is localized to the neuromuscular junction, there are no sensory findings. The classic presentation is descending, symmetric paralysis which typically starts in the bulbar muscles. Such patients present with dysarthria, diplopia and dysphagia which progresses to generalized weakness. The toxin does produce anticholinergic symptoms due to its inhibition of cholinergic output. Therefore, the patient's pupils may be dilated and unreactive, which can be a useful feature for differentiating such patients from those with myasthenia gravis. Gastroenteritis may or may not occur, but the onset of symptoms is not until 6 to 48 hours after ingestion. Mental status remains intact.
- 7 Answer A. Endocarditis prophylaxis with antibiotics for patients with prosthetic or damaged valves is recommended for the following procedures: Dental cleaning, rigid bronchoscopy, ERCP, and cystoscopy.
- 8 Answer E. Because cerebral perfusion pressure (CPP) = mean arterial pressure (MAP)—intracranial pressure (ICP), acute reductions in the MAP may have drastic and potentially grave effects on a patient's CPP. One of the most common errors in the treatment of patients with ischemic strokes is the overly aggressive treatment of hypertension. Because this patient is not a candidate for tPA (because she presented >3 hours after the onset of her symptoms), the general consensus is that her hypertension does not warrant treatment unless her blood pressure is >220/120 mm Hg or her MAP is >130 mm Hg. If this is the case, then either nitroprusside, labetalol or IV enalapril may be used to rapidly gain control of the patient's blood pressure. Additionally, in patients who are tPA candidates, these medicines can be used to bring a patient's blood pressure below the 185/105 mm Hg threshold required for the administration of tPA. Exceptions to this approach may also apply in patients with an ischemic stroke and concomitant MI, aortic dissection or acute renal failure due to malignant hypertension. Such patients may require emergent interventions to decrease blood pressure due to these concomitant conditions. In all other patients with acute ischemic stroke, moderate hypertension as defined in the preceding text is thought to be neuroprotective by maintaining adequate CPP. Nimodipine is a calcium-antagonist that is used in patients with subarachnoid hemorrhage (SAH), and it has been shown to improve outcome in such

patients. Whether it exerts its protective effects by reducing vasospasm is still an object of study.

- 9 Answer E. The patient appears to have evidence of a specific dystonic reaction known as the *oculogyric crisis*, where both the patient's eyes stare upward and do not come back to the neutral position. Symptoms can fluctuate based on emotional state. Dystonic reactions are usually due to an excess of cholinergic activity due to overblockade of dopaminergic receptors by antipsychotic medications. The normally inhibitory effect of dopamine on the cholinergic neurons is reduced with the use of antipsychotic agents. Treatment for acute dystonic reactions is with an anticholinergic agent, either benztropine or diphenhydramine. Discharging the patient home neither treats the patient nor adequately manages the social situation. Psychiatric consultation for a new psychotropic medication prescription is not appropriate until the primary cause of the complaint has been evaluated and addressed. Haloperidol would further worsen the oculogyric crisis. Lorazepam might sedate the patient but would probably not improve the dystonia.
- 10 Answer B. There are no clear diagnostic criteria for hyperemesis gravidarum. However, it is generally considered to be nausea and vomiting related to pregnancy that is severe enough to result in weight loss, starvation ketoacidosis, electrolyte imbalance, alkalosis from vomiting, and dehydration. Liver enzymes may be elevated in up to 25% of hospitalized women, although they are not normally increased beyond four times the upper normal limit. This more frequently occurs when hyperthyroidism accompanies hyperemesis. Hyperthyroidism complicating hyperemesis is transient and usually resolves by 14 to 16 weeks' gestation, along with the symptoms of hyperemesis. The elevated levels of thyroid hormone are thought to result from high levels of β -hCG, which is known to stimulate the thyroid-stimulating hormone (TSH) receptor.
- 11 Answer B. Ischemic or hemorrhagic cerebellar infarction is frequently associated with vertigo due to disruption of various vestibulocerebellar pathways. Typical symptoms associated with cerebellar infarction include headache, nausea and vomiting, ataxia with inability to walk (i.e., truncal ataxia), vertigo, and dysarthria. The fall that this patient had 2 weeks ago was likely a drop attack due to ischemia within the vertebrobasilar arterial system. Lesions within the cerebellum result in ipsilateral clinical deficits due to "double crossing" although many pathways also have bilateral projections. Such patients may

deteriorate rapidly and require vigilant observation in an intensive care setting.

- 12 Answer C. PP refers to the "paradox" that heart sounds are heard, although no peripheral pulse is felt. Furthermore, the clinical assessment of this "pulse" is performed through measurement of the peak systolic blood pressure (SBP). It is caused by a physiologic decrease in the amplitude of the pulse up to 10 mm Hg during inspiration and an increased amplitude during expiration. A difference of >10 mm Hg is pathologic. The negative intrathoracic pressure generated during inspiration causes increased venous return and right ventricular distension. The interventricular septum bulges to the left, reducing the size and the subsequent stroke volume of the left ventricle. The decreased stroke volume causes cardiac output to fall, which decreases blood pressure. Although PP is present in the setting of a tension pneumothorax, the most common extracardiac cause is asthma. This is in part due to chest hyperinflation and in part due to an exaggerated difference in intrathoracic pressures that occur throughout the respiratory cycle. Patients with severe asthma exacerbations frequently have a widened PP. One important thing to consider, however, is that the measurement of PP depends on patient effort. Therefore, in a deteriorating asthmatic who has decreasing thoracic excursion, the PP will fall, and this should not be interpreted as an improvement in the patient's condition.
- 13 Answer A. Lipase and amylase have roughly the same sensitivity for diagnosing acute pancreatitis, although their sensitivity depends on the threshold value above normal used to establish the diagnosis (most authors suggest a cutoff of three times the upper limit of normal). Lipase is almost certainly more specific than amylase, because almost all lipase originates from the pancreas. However, there is a small amount of gastric lipase, and lipase levels may be elevated in the setting of a gastric or duodenal ulcer, severe renal insufficiency or in some cases of bowel obstruction. Although both enzymes tend to rise at approximately the same rate, lipase remains elevated for a longer period of time (lipase remains elevated for 8 to 14 days, although amylase returns to normal after 5 to 7 days). The degree of elevation of amylase or lipase does not correlate with disease severity. The ratio of amylase to lipase has not proved to be useful.
- 14 Answer D. Gastric volvulus is a rare disorder that chiefly occurs in older people and results from twisting of the stomach about its long axis (organoaxial volvulus). Twenty percent of cases occur in infants younger than 1 year due to congenital diaphragmatic defects. In older people, it is frequently associated with large paraesophageal hiatal hernias. The classic triad is known as Borchardt's triad, and consists of severe epigastric pain and abdominal distension, vomiting, and the inability to pass a nasogastric tube. If the diagnosis is suspected, the ED physicians should attempt to pass a nasogastric tube because this occasionally reduces the volvulus. Owing to its redundant blood supply, gastric infarction is uncommon, even in delayed cases, occurring in as many as 25% of cases.
- 15 Answer E. Calcium pyrophosphate dihydrate-CPPD) crystal deposition disease or pseudogout, is most commonly idiopathic. However, it may also be secondary to any of the underlying conditions listed. Attacks are typically not as severe as in gout, although they share the same management.
- 16 Answer E. Patients with severe upper gastrointestinal bleeding (UGIB) require emergent blood transfusion which may be life saving. In patients with more moderate bleeding, continuous infusions of proton pump inhibitors (PPIs) have been shown to improve outcome by reducing the need for blood products and reducing the need for reintervention. However, intermittent bolus administration is much less effective than continuous infusion. This is because continuous PPI infusions maintain gastric pH >4 (the threshold for pepsin inactivation). Bolus administration allows gastric pH to fluctuate and episodes of increased gastric acidity may disrupt clot formation. H₂ inhibitors do not alter the natural history of UGIB. Sengstaken-Blakemore tubes are rarely used adjuncts to stop hemorrhage from esophageal varices. Though they are effective, they have a high complication rate and should only be used when endoscopy is not immediately available. Ewald tubes are large bore nasogastric tubes used for gastric lavage. They may be useful to irrigate the stomach before endoscopy or in cases of acute toxic overdose as a means of decontamination. Octreotide is primarily used for acute variceal hemorrhage although it may be useful as an adjunct in cases of nonvariceal UGIB. This question is still being studied.
- 17 Answer C. Infants with pyloric stenosis typically present between 2 and 6 weeks of age with progressive, projectile, nonbilious emesis. Persistent emesis results in a loss of hydrogen and chloride ions from the gastric juices (hydrochloric acid) resulting in a hypochloremic alkalosis. With time, cellular exchange mechanisms pump hydrogen ions into the blood in exchange for potassium ions resulting in hypokalemia.

18 Answer C. This EKG reveals changes consistent with hyperkalemia. Cardiac arrhythmias are the most serious consequence of hyperkalemia and the presence of EKG changes mandates emergent therapy. This patient's EKG demonstrates peaked T waves, which are among the early EKG changes in the setting of hyperkalemia, typically occurring at levels above 6.5 mEq per L. In general, hyperkalemia decreases cardiac excitability resulting in flattened P waves, a prolonged PR interval, and a widened QRS interval. Although all the agents listed are beneficial in patients with hyperkalemia, calcium is the agent of choice, as it has a rapid onset of action (1 to 3 minutes), and stabilizes myocardial membranes. Calcium gluconate or calcium chloride may be given, but calcium chloride provides three times the amount of elemental calcium per unit dose. However, calcium chloride may cause tissue necrosis upon extravasation from intravenous lines and is irritating to local veins. Therefore, most authors recommend that calcium chloride is delivered through a large-bore central venous catheter. (Figure reprinted with permission from Wagner G. *Marriott's practical electromyography*, 10th ed. Lippincott Williams & Wilkins; 2001:225.)

19 Answer D. Psychiatric emergencies necessitating admission to the hospital include suicidal ideation, homicidal ideation, acute mania, acute psychosis, or inability to cooperate with treatment or care for self. A past history of psychiatric disease, including mood or thought disorders, is not sufficient to warrant admission, especially if symptoms are well controlled with medication. Acute ethanol intoxication should not be a criterion for admission to the hospital—patients should be questioned regarding specific psychiatric symptoms after the ethanol has been metabolized and the patient has the capacity to give a coherent history. A patient with a major depressive episode that lacks significant risk for suicide need not be admitted to the hospital if adequate outpatient follow-up is arranged, if the patient can contract for safety, and if the patient has a sufficient support system.

20 Answer A. The vasculitic syndromes have multiple areas of overlap in their clinical manifestations and it is sometimes difficult for rheumatologists to apply a specific diagnosis. However, classically, polyarteritis nodosa (PAN) causes mononeuritis multiplex and mesenteric ischemia. Cutaneous findings are also common. Takayasu's arteritis is very common in Japan and results in coronary ischemia. Wegener's granulomatosis initially presents with symptoms of upper airway problems such as sinusitis, otitis, and nasal congestion while developing

glomerulonephritis at a later stage. Behçet's disease is characterized by recurrent oral and genital ulcerations and recurrent hypopyon (its rarely seen, but pathognomonic finding). Churg-Strauss syndrome involves the lungs and most patients have symptoms of asthma in the 2 years preceding a diagnosis.

21 Answer A. Both primaquine/clindamycin and pentamidine are alternative regimens for PCP treatment. However, pentamidine can only be administered intravenously or by inhalation. Therefore, primaquine and clindamycin comprise the best alternative outpatient regimen. Intravenous pentamidine is the treatment of choice for patients unable to tolerate TMP-SMX. In addition to allergic responses, TMP-SMX has many side effects including a high incidence of skin rash and bone marrow suppression. In the outpatient regimen of primaquine and clindamycin, the clindamycin is included because primaquine lacks activity against community-acquired pathogens. Because only patients with mild to moderate disease will be discharged from the hospital, it is imperative to include coverage for routine community-acquired pneumonia (CAP) in addition to giving antibiotics which target PCP. In mild cases, or when the patient's CD4⁺ T-cell count hovers close to 200, it may be difficult to distinguish between PCP and CAP.

22 Answer C. Traumatic aortic injury (TAI) occurs most commonly from high-speed motor vehicle collision (MVCs) causing blunt thoracic trauma. Most traumatic aortic ruptures are immediately fatal, but patients who survive to ED evaluation are usually successfully treated. The descending aorta just distal to the subclavian artery is the most commonly injured site. Chest and back pain are the most common symptoms. The initial screening test is plain chest x-ray—however, the sensitivity of plain films is only up to 85%. In cases where suspicion for TAI is high, confirmatory CT aortography should be performed, as it has close to 100% sensitivity. Transesophageal echocardiography may be used in select cases where CT scan is not possible, but transthoracic echocardiography is much less accurate and should be used only to evaluate for pericardial effusion or tamponade, not TAI. Management of TAI involves operative repair, but blood pressure and heart rate control with β -blockers is essential to prevent further damage to the aorta from shear forces.

23 Answer B. Lie refers to relation of the longitudinal axis of the fetal spine to the longitudinal axis of the uterus. Only fetuses with a longitudinal lie may be safely delivered vaginally. Presentation refers

to the fetal part that overlies the maternal pelvis. Approximately 95% of pregnancies are cephalic in presentation. Any presentation that is not cephalic is referred to as a malpresentation. In cephalic presentations, the smallest possible presenting diameter occurs when the fetal head is maximally flexed (attitude refers to the relationship of the fetal head to its spine, i.e., flexion or extension). Position refers to the relationship of the presenting part of the fetus to the maternal pelvis. In cephalic presentations, the occiput is used as a reference point, whereas in breech presentations, the sacrum is the fetal reference point. Station refers to the distance of the fetal presenting part from the maternal ischial spines. A station of 0 implies that the leading bony edge of the fetus is at the level of the ischial spines.

- [24] Answer A. Noroviruses, which include Norwalk virus, are responsible for 50% to 80% of all cases of acute infectious diarrhea. However, most patients with acute infectious diarrhea do not seek medical treatment. Patients who seek medical attention are more likely to have a bacterial cause, most commonly *Campylobacter* spp.
- [25] Answer B. *Cryptosporidium parvum* is a parasite, which often causes subacute and chronic diarrhea in patients with AIDS. Highly active antiretroviral therapy (HAART) is the best treatment for *Cryptosporidium* diarrhea. Symptoms are virtually eliminated if CD4 counts are maintained >100 cells per μ L. Antidiarrheal agents and antibiotics work with only varying degrees of success and the symptoms are often recurrent after these drugs are stopped. Octreotide has no role in the management of HIV-associated infectious diarrhea.
- [26] Answer E. Pyogenic liver abscesses are uncommon infections that most commonly occur as a complication of biliary tract infections (e.g., cholangitis, cholecystitis). A sizable number of cases are also cryptogenic. In the past, untreated appendicitis complicated by pylephlebitis was a very common cause, particularly in young patients. Most infections are polymicrobial and a broad range of organisms is typically involved. The treatment for pyogenic liver abscesses is surgical drainage and antibiotic therapy.
- [27] Answer A. The patient has acute arterial occlusion from arterial embolism, likely due to atrial fibrillation caused by hyperthyroidism. Treatment involves anticoagulation and emergent embolectomy due to the limb-threatening nature of the occlusion. Bypass surgery is usually used in patients who have in situ thrombosis. Anticoagulation alone is used as adjunctive ED therapy for patients with acute

arterial occlusion, but is usually not adequate to treat limb-threatening ischemia due to an embolus. Lumbar sympathectomy and hyperbaric oxygen therapy provide no benefit in these circumstances.

- [28] Answer B. Alcohol is the toxin most commonly associated with seizures. Most alcohol-related seizures are due to alcohol withdrawal and typically occur between 6 and 48 hours after discontinuation of drinking. However, alcohol withdrawal seizures have been known to occur as long as 7 days after discontinuation of drinking, particularly in cases of polysubstance abuse with benzodiazepines and barbiturates. Interestingly, acute alcohol intoxication can also provoke seizures and there is some electroencephalographic evidence to suggest a lowered seizure threshold in this setting.
- [29] Answer B. Cyanosis, a bluish discoloration of the skin and mucous membranes caused by the presence of deoxyhemoglobin (unsaturated hemoglobin) is actually an uncommon finding in asthmatic patients. It is only visible when the absolute quantity of unsaturated hemoglobin exceeds 4 g per dL. Patients experiencing an asthma exacerbation have a respiratory alkalosis ($P_{aCO_2} \downarrow$) resulting from their pronounced hyperventilation. This alkalosis shifts the oxyhemoglobin dissociation curve to the left, which means that at any given partial pressure of oxygen there is more saturated hemoglobin. Therefore, only profoundly hypoxic patients or patients who have ventilatory failure ($P_{aCO_2} \uparrow$) will exhibit cyanosis. In most asthmatics (>50%) with an exacerbation, respiratory rates range between 20 breaths per minute and 30 breaths per minute, although <20% of patients have rates ≥ 30 breaths per minute. Thus, while patients with a RR <40 may be experiencing a severe asthma exacerbation, patients with a RR >40 almost always have severe asthma (as defined by an FEV1 <1.0L). Pulsus paradoxus (PP) may be absent in 50% of patients with severe asthma. In severe obstruction, PP is >10 mm Hg (the normal value) but only extremely high PP (>25 mm Hg) correlates with severe asthma. Accessory muscle use is a sign of severe airflow obstruction and is not present during mild exacerbations. In patients with refractory severe airflow obstruction, especially those who are becoming fatigued, the volume of wheezing may decrease as their condition worsens because the total volume of air movement is small. Despite the fact that the obstruction is severe, the patient may not be ventilating enough air to generate wheezes.
- [30] Answer E. The patient has iritis, which is treated primarily with topical steroids and mydriatics. Ophthalmologic consultation is generally pursued

before the initiation of steroids. The history of consensual photophobia and physical examination demonstrating perilimbal conjunctival injection (ciliary flush) is characteristic. Topical antibiotics are used to prevent bacterial superinfection in corneal abrasions or viral conjunctivitis. Hypertonic eye drops are used for corneal hydrops (extreme corneal edema). Mannitol therapy for lowering intraocular pressure is indicated for patients with glaucoma. Ocular massage is indicated for patients with central retinal artery occlusion to try to dislodge embolus or thrombus and cause it to migrate to a more distal site in the circulation.

31 Answer C. Sickle cell disease is a hemoglobinopathy causing sickling of RBCs with any systemic stress, which results in diffuse microinfarctions. Sickle cell trait is present in approximately 10% of all African Americans, and sickle cell disease is primarily a disease of this population. Symptoms involve multiple organ systems and result in specific acute crises—vaso-occlusive, acute chest syndrome, splenic sequestration, and aplastic. The overall most common cause of death in patients with sickle cell disease is from infection, usually pneumonia. Owing to autoinfarction of the spleen, patients are at risk for overwhelming sepsis from encapsulated organisms, such as *Streptococcus pneumoniae*, *E. coli*, and *Haemophilus influenzae*. Stroke is another common cause. Aplasia and splenic sequestration occur less often. MI is rare in sickle cell patients, as coronary artery disease, although probably accelerated in these patients, does not usually progress far enough to significantly increase the risk of infarction.

32 Answer C. Inflammation of the iris caused by trauma causes constant pain and photophobia, especially consensual photophobia (light exposure to the unaffected eye causes pain in the affected eye due to consensual constriction). Long-acting cycloplegics and steroids are the mainstay of treatment. The pupil is reactive and constricted, and ciliary flush (conjunctival injection in a circular rim around the limbus) is prominent. Resolution should occur within 1 week.

33 Answer C. Uterine atony is the most common cause of immediate postpartum hemorrhage (defined as blood loss that occurs within the first 24 hours of delivery), as it is responsible for approximately 50% of cases. The risk factors for uterine atony are multiparity, prolonged labor, excessive uterine manipulation, and general anesthesia with halogenated anesthetic agents. Management involves abdominal or bimanual uterine massage as well as the use of oxytocic agents such as oxytocin,

methylergonovine maleate or ergonovine maleate, or carboprost tromethamine. Tears of the maternal birth canal may also result in significant hemorrhage and are the second most common cause (as a group). Retained placental tissue accounts for roughly 10% of immediate postpartum hemorrhage. If uterine massage and oxytocic agents fail to control bleeding thought to be due to uterine atony, a meticulous search should be conducted for maternal birth trauma or retained placental tissue.

34 Answer E. Adult trauma patients with head injury are rarely hypotensive because of the intracranial process itself, except in the end stages of herniation or severe scalp injuries. The fixed bony skull limits the degree of hemorrhage in adult patients. In infants, the flexibility and larger proportional size of the skull may allow enough bleeding to cause hypotension. In adult trauma patients, an extracranial cause of hypotension should aggressively be sought, such as bleeding in the chest, abdomen, retroperitoneum, pelvis, or femurs. Treatment of hypotension in the head-injured patient should be undertaken quickly because cerebral blood flow is dependent on mean arterial pressure (MAP) and limited by intracranial pressure (ICP).

35 Answer C. Urinalysis is a crucial diagnostic tool for the evaluation of all urinary system conditions. The presence of casts in the urine indicates a renal source—RBC casts are associated with glomerulonephritis and white blood cell casts with parenchymal inflammation, such as pyelonephritis. Urine dipstick is a rapid screening tool to detect the presence of glucose, leukocytes, protein, and blood. Unfortunately, sensitivity for most of these parameters is only on the order of 75% to 85% and negative dipstick should not be used to rule out their presence. Transitional cells are from a bladder source, but are usually a normal finding and do not necessarily indicate a malignant process. Normal urinary pH is from 5 to 8 and usually mirrors serum pH except in certain disease states, such as renal tubular acidosis or urinary tract infection.

36 Answer C. The distal interphalangeal (DIP) joints are never affected in rheumatoid arthritis (RA), which provides a useful means of differentiating the disease from osteoarthritis (OA). The arthritis of RA is typically polyarticular and symmetric, particularly affecting the hands (MCP and PIP joints), wrists, and elbows. The disease is twice as common in women and peaks in the fourth to sixth decade. Two thirds of patients with RA develop cervical spine disease, although thoracic and lumbar disease is uncommon. The disease

most commonly involves the occipitoatlantoaxial junction and anterior atlantoaxial subluxation may occur. Rheumatoid factors (RFs) are autoantibodies directed at the crystallizable fragment (Fc) of human immunoglobulin molecules. The exact incidence of RF depends on the assay used and the threshold titer used to separate positive from negative results. In general, roughly 15% of patients with RA will be seronegative (RF within the normal range) and those patients tend to have milder disease.

- 37** Answer D. Tube thoracostomy is a procedure that is fraught with potential complications. In a recent series of 47 trauma patients, the complication rate was 30%. Complications that will be evident in the ER are usually related to tube insertion, such as kinked or clotted tubes, intercostal artery lacerations, lung lacerations, diaphragmatic perforation, or insertion of the tube subcutaneously. Infectious complications such as empyema occur well after insertion, requiring at least a few days to develop. Reexpansion pulmonary edema (REPE) is a rare, but potentially fatal consequence of tube thoracostomy. Its incidence is uncertain, however, because early studies did not report this complication whereas more recent studies have reported an incidence as high as 14%. Patients with pneumothoraces >30% are at greatest risk for developing REPE. Some studies have also shown that the presence of a pneumothorax for a prolonged period (>3 days) before reexpansion is also a risk factor. No controlled studies have demonstrated the best treatment for individuals with such risk factors. However, the consensus of the American College of Chest Physicians is that in patients with a $\geq 30\%$ pneumothorax, a small bore chest tube (16–22 French) should be used and placed to water-seal *only* or to a Heimlich valve device. As some studies have suggested that the rate of reexpansion may also play a role, vacuum suction should not be used. All such patients should be admitted. Because negative pressure is not being applied, lung reexpansion may not occur, and suction may be required especially if the patient is clinically unstable. If REPE develops, treatment is supportive as with other causes of noncardiogenic pulmonary edema.

- 38** Answer C. Electroencephalogram (EEG) changes last for an average of 59.9 seconds (standard deviation of 12 seconds), whereas behavioral changes last 52.9 to 62.2 seconds (with a standard deviation of 14 seconds). Therefore, a seizure that has lasted for 5 minutes is more than 17 standard deviations longer than the "typical" seizure. This is partly why status epilepticus is now "operationally" defined as any seizure lasting 5 minutes. The traditional definition has been any seizure lasting 30 minutes, or recurrent

seizures without an interictal return to baseline mental status.

- 39** Answer C. The EKG demonstrates atrial flutter at a ventricular rate of 50. The risk of atrial thrombus increases with the amount of time the patient is in atrial fibrillation or atrial flutter. Emergent management of atrial fibrillation or flutter involves reduction of rate to below 100 and anticoagulation if the duration of the dysrhythmia is longer than 48 hours, unless echocardiogram indicates no cardiac thrombus. This patient is not tachycardic and requires no rate controlling agents such as diltiazem or esmolol. Amiodarone is not indicated as this may actually terminate the atrial flutter and put the patient back into sinus rhythm and at risk for thromboembolus. Adenosine is indicated for paroxysmal supraventricular tachycardia—it may be used in unclear cases of narrow-complex tachycardia, but has no role in obvious atrial flutter.
- 40** Answer E. This case demonstrates the "80% rule" of neck masses. Eighty percent of neck masses in children are benign, 80% of nonthyroid neck masses in adults are neoplastic and 80% of those are malignant. Therefore, most nonthyroid neck masses in adults are malignant. Referred ear pain and signs of otitis media with effusion increase the likelihood of cancer. Any degree of stridor, dysphagia, or severe hoarseness mandates immediate ENT consultation, as airway obstruction may be imminent.
- 41** Answer C. Isopropanol classically does not cause an elevated anion gap when ingested. The osmolar gap, however, is elevated and should be calculated and measured when there is suspicion of toxic alcohol overdose. Elevation of the anion gap due to lactic acidosis can occur in cases of severe isopropanol poisoning if there is associated coma, gastrointestinal hemorrhage, or hypotension. Choices A, B, D, and E all cause an elevation in the anion gap at some point during their metabolism.
- 42** Answer A. MRI is the most specific test for the diagnosis of aortic dissection. Logistic difficulties prevent routine use of MRI in this setting—for this reason, CT aortogram is the most commonly used test and has excellent sensitivity and specificity. Chest x-ray is abnormal in most cases, but the sensitivity is not high enough to rule out the diagnosis in high-risk patients. Transesophageal, not transthoracic, echocardiography may provide useful structural information about the descending aorta, heart, and pericardium, but CT aortogram and MRI are far more specific. Aortography is used only in confirmatory settings. Electrocardiography is useful

only in ruling out other causes of the patient's symptoms and have no utility in confirming the diagnosis of aortic dissection.

- 43** Answer E. Nonaspirin NSAIDs, including ibuprofen, produce generally benign and self-limited conditions in overdose. Symptoms will occur within 4 hours of ingestion, are usually mild, and resolve within 24 hours. Patients rarely have life-threatening overdoses and almost never require antidotes, decontamination, augmented renal excretion, or invasive therapies such as hemodialysis. Serum levels of nonaspirin NSAIDs are not clinically useful. Of overdoses with nonaspirin NSAIDs, phenylbutazone and mefenamic acid are more serious, potentially causing multiorgan dysfunction and seizures, respectively.
- 44** Answer C. Viscosity decreases with any inflammatory process of the joint because of decreased hyaluronic acid, which is the main contributor to synovial fluid viscosity. Rheumatoid arthritis (RA) classically affects the metaphalangeal (MP) and PIP joints of the hand, whereas osteoarthritis (OA) affects the first carpometacarpal joint as well as the proximal (PIP) and distal interphalangeal (DIP) joints. Systemic lupus erythematosus (SLE) may cause inflammation of serosal surfaces such as the pleura or pericardium. Pericarditis in a patient with SLE may result in an audible cardiac friction rub. Reiter's syndrome may cause sausage-shaped swelling of the digits. An abducted, externally rotated hip in a neonate suggests infection, even in patients who are afebrile.
- 45** Answer D. Only intravenous medications are appropriate for rapid, measured control of blood pressure. Nitroprusside is very easily titrated and extremely effective, making it the drug of choice for hypertensive crises. Nifedipine has been associated with severe side effects due to its unpredictable response. Isoproterenol is a β -agonist and will not decrease blood pressure. Phenoxybenzamine is an α -blocking agent used mostly in the prevention of catecholamine surge during therapy for pheochromocytoma. Hydrochlorothiazide is an oral medication appropriate for outpatient therapy for chronic hypertension.
- 46** Answer D. Age-related macular degeneration is the most common cause of blindness in the industrialized world. It occurs primarily because of retinal damage from unknown causes. Almost one fourth of all Americans older than 90 are affected by macular degeneration.
- 47** Answer D. Follicular cysts are the most frequent adnexal cystic structures in women with normal ovaries. Follicular cysts represent remnants of previously normal follicles that grew in response to follicle stimulating hormone (FSH) and then failed to involute. They are typically clinically silent but they may cause pelvic pain or heaviness, as well as urinary frequency and constipation if they are large enough. They are self-limited and involute over a period of weeks to months. Corpus luteum cysts are less common but more clinically relevant. They also represent remnants of formerly normal physiologic structures; in this case, the corpus luteum. Unlike follicular cysts, they have a propensity to be complicated by intracavitary hemorrhage. If the hemorrhage is brisk, the intracystic pressure may rise very quickly resulting in rupture. Such an event may result in acute onset, severe pelvic pain, and may be associated with significant hemorrhage depending on the size of the cyst. Theca lutein cysts are uncommon, typically bilateral, and associated with prolonged or excessive ovarian stimulation. Dermoid cysts are benign ovarian teratomas that contain tissue from all three germ cell layers. They do not pose an immediate danger but patients should be referred for further management because they may undergo malignant transformation, particularly in women older than 40. Finally, ovarian fibromas are the most common, benign, solid neoplasms of the ovary. They are extremely slow growing but may grow to very large sizes.
- 48** Answer D. Most aspirated foreign bodies are of vegetable origin and are therefore radiolucent. Therefore, the diagnosis of foreign body aspiration is most commonly made by virtue of symptoms of respiratory distress such as wheezing, persistent cough, and choking. In addition, clinicians may detect decreased breath sounds on the side of the obstruction. Although most aspirated foreign bodies are radiolucent, most chest x-rays are abnormal. Unilateral obstructive emphysema is the most common indirect finding indicating airway obstruction. The aspirated foreign body creates a one-way valve effect, allowing inspired airflow but preventing complete exhalation. This creates hyperexpansion and relative hyperlucency with decreased lung markings on the affected side. However, atelectasis and pneumonia are also common findings. Delayed presentations of foreign body aspiration are common, due in part because many children aspirate food particles while unattended. They subsequently experience a brief symptomatic phase and then may be relatively asymptomatic, or have "low-level" symptoms that may be mistaken for a viral respiratory illness. Owing to the relatively smaller caliber of their airways,

however, infants younger than 12 months typically present more acutely than older children. In general, children between the ages of 1 and 3 years are at highest risk for foreign body aspiration. Classic teaching is that most aspirated foreign bodies lodge in the right mainstem bronchus due to its more acute angle with the trachea. Some studies however, do not reveal a statistically significant difference between foreign body aspiration to the left or right mainstem bronchus. They do, however, demonstrate that foreign bodies are more commonly located in either the right or left bronchus than in the trachea. The most predictive finding in foreign body aspiration is an episode of witnessed aspiration followed by choking.

- 49 Answer A. All of the listed items are potential causes of pruritus ani, but the presence of fecal matter on the perianal skin is the most common.
- 50 Answer E. The most dangerous acute complication is upper airway obstruction. Like any other patient with supraglottic airway obstruction, such patients usually appear toxic and present with respiratory distress, inspiratory stridor, and accessory muscle use. Such patients should be allowed to find their own most comfortable position and should never be forced to lie flat. Furthermore, anesthesia consultation may be required in order to perform fiberoptic intubation. The ED physician should also be prepared to perform emergency cricothyroidotomy. In addition to the other complications listed, jugular vein thrombosis, carotid artery erosion, pneumonia, empyema, pulmonary abscess, cervicohoracic necrotizing fasciitis, and intracranial or parapharyngeal extension of the infection may all complicate peritonsillar abscesses.
- 51 Answer B. Cellulitis in the healthy patient is most often caused by streptococci and staphylococci. Initial antibiotic therapy is usually with a penicillinase-resistant penicillin or first generation cephalosporin. Doxycycline and clindamycin are appropriate alternatives. Gentamicin covers mostly gram-negative bacteria which might be indicated as part of treatment for cellulitis in an immune-compromised patient. This patient has an allergy to penicillin and dicloxacillin is therefore contraindicated. Linezolid is generally restricted for the treatment of vancomycin-resistant organisms, which are usually nosocomial. Metronidazole covers anaerobes only and would not be appropriate as monotherapy for cellulitis.
- 52 Answer B. The baseline risk of a heterotopic pregnancy is reported to be 1 in 4,000 pregnancies or 0.025%. However, *in vitro* fertilization and other assisted reproductive technologies (ART) dramatically

increase the risk of a heterotopic pregnancy. The risk of a heterotopic pregnancy in the setting of *in vitro* fertilization is approximately 1%, whereas the risk in the setting of some ART therapies may be as high as 4.5%. The key aspect to recognize is that ART is the primary risk factor for heterotopic pregnancy and the resulting risk of heterotopic pregnancy is approximately the same as the risk for ectopic pregnancy in the general population.

- 53 Answer C. The patient has nausea, vomiting, an elevated anion gap, ketosis, and a normal glucose in the setting of excessive alcohol use with starvation. Alcoholic ketoacidosis (AKA) is the most likely cause. Treatment of AKA is with fluid resuscitation, glucose, and thiamine. Bicarbonate is not indicated in most patients with high anion gap metabolic acidosis except in severe, life-threatening cases. Insulin is indicated in patients with diabetic ketoacidosis (DKA), which rarely presents with a normal glucose level or in an adult patient with no prior history of diabetes. Potassium repletion may be indicated if hypokalemia is present or expected during the course of therapy. Magnesium supplementation is often indicated in chronic alcoholic patients, but glucose therapy is of more importance as an energy substrate in patients with alcohol ketoacidosis.
- 54 Answer A. The lateral or fibular collateral ligament complex comprises of three ligaments that tend to rupture in an anterior to posterior sequence during ankle sprains. The anterior talofibular ligament is the weakest, and rupture results in a positive anterior ankle drawer test. The calcaneofibular is next and the posterior talofibular is the most posterior portion of the fibular collateral ligament. The deltoid ligament is 20% to 50% stronger than its lateral counterpart and is infrequently injured in isolation. The anterior inferior tibiofibular ligament is the weakest ligament of the four syndesmotomic ligaments that attach the distal tibia and fibula. The syndesmosis prevents displacement of the tibia and fibula relative to one another and disruption can contribute to significant instability.
- 55 Answer E. Although >75% of patients with pulmonary embolism (PE) will have an abnormal chest x-ray, no single finding is diagnostic for PE. Westermarck's sign (decreased peripheral vascular markings in the lung field affected by the embolus) and Hampton's hump (a wedge-shaped homogeneous density with its base along the pleural surface and its apex pointed toward the hilum representing pulmonary infarction) are the classic findings but both findings have very low sensitivity and specificity. In addition to the other findings listed, parenchymal

infiltrates, hilar or mediastinal enlargement, cardiomegaly, pleural effusions, pulmonary edema, and a prominent central pulmonary artery (Fleischner's sign) may also be seen. None are sensitive or specific findings.

- 56** Answer E. Penetrating injury to the globe with a foreign body still in place mandates operative removal. No attempts should be made by the EP to manipulate the foreign body. Broad-spectrum antibiotics should be given for suspicion of globe rupture and emergent ophthalmologic consultation should be obtained. Measurement of intraocular pressure is absolutely contraindicated in cases of possible globe rupture. Slit lamp examination is neither indicated (because of planned operative evaluation anyway) nor possible (because of the mechanical blockade by the foreign body). MRI is contraindicated in patients with a possibility of an intraocular metallic foreign body. (Figure from Tasman W, Jaeger EA, eds. *The Wills Eye Hospital atlas of clinical ophthalmology*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2001, with permission.)
- 57** Answer A. Somatization disorder refers to a constellation of physical symptoms that cannot be explained by a known medical condition. Pain, gastrointestinal, sexual, and neurologic symptoms predominate. An integral part of the diagnosis is that the patient is not faking the symptoms—he or she truly is experiencing them and will argue against any evidence that indicates somatization. Somatizing patients have an uncontrollable need to assume the “sick role,” which allows them to be cared for. The most common personality disorder associated with somatizing patients is histrionic—well over half the number of patients meet the diagnostic criteria. Management of these patients in the ED involves empathetic recognition and acknowledgement of the patient's symptoms, evaluating for true medical illness as a cause of the symptoms, and referral to psychiatry or primary care for outpatient evaluation. It is crucial for the EP to review old records of patients suspected of somatization disorder, as these patients often undergo repeated unnecessary testing in the ED. Discussions with the patient's primary care physician is mandatory as this will help to tailor emergent workup. Pharmacotherapy is of little benefit in the acute setting.
- 58** Answer C. Raynaud's phenomenon is nearly universal in patients with scleroderma (also known as *systemic sclerosis*) and is the earliest sign of the disease. Raynaud's phenomenon is also common in patients with lupus and rheumatoid arthritis (RA).
- The exact mechanism of Raynaud's phenomenon in scleroderma (or in other autoimmune diseases) is not known. Raynaud's phenomenon may also be a primary problem (in which case it is sometimes referred to as *Raynaud's disease*), rather than secondary to an underlying disease. To be considered a primary process, patients need to suffer no ischemic damage in the affected digits (e.g., gangrene, necrosis), have negative serology (e.g., particularly for antinuclear antibodies), have a normal erythrocyte sedimentation rate, have symmetric attacks, and lack physical examination findings which suggest a secondary cause.
- 59** Answer A. The patient has evidence of tardive dyskinesia, a syndrome of uncontrollable contractions of the facial muscles because of long-term therapy with neuroleptic medications. The risk for development of this disorder is increased with longer duration of treatment, total cumulative dosage of medication, concomitant mood disorder, and patient age. Symptoms do not usually start until several years into the neuroleptic therapy. Tardive dyskinesia is only rarely reversible if the causative medication is stopped. Elderly women are the highest risk group. Specific treatment does not exist for the condition, although benzodiazepines and the newer atypical antipsychotic medications have reduced the incidence.
- 60** Answer C. Abdominal masses in infants are usually renal in origin, most commonly benign tumors or cysts. Both neuroblastoma, most often arising from the adrenal glands, and Wilms tumor, the most common renal malignancy, are frequent causes of abdominal masses. Renal ultrasonography or CT of the abdomen and pelvis should be performed to better evaluate the mass. Gall bladder tumors and stones are rare in infants. Scrotal ultrasonography will help to evaluate groin and testicular pathology, but is not useful for abdominal evaluation. Urinalysis is commonly normal in patients with renal cysts or tumors. A Meckel's scan is useful to evaluate a Meckel's diverticulum, which usually presents with painless rectal bleeding rather than mass.
- 61** Answer D. The average case-fatality rate is 51% with most deaths occurring within 2 weeks of the ictus and an estimated 10% of deaths occurring before a patient receives any medical attention.
- 62** Answer C. Herpes simplex encephalitis is clinically indistinguishable from other types of meningoencephalitis, causing headache, stiff neck, fever, and altered mental status. Temporal lobe involvement is typical and may be visible on neuroimaging. HSV-1 is the usual cause in adults; neonates have a higher

incidence of HSV-2 due to maternal infection. As in other cases of suspected meningoencephalitis, lumbar puncture and cerebrospinal fluid (CSF) studies are indicated, though herpes simplex virus (HSV) culture is negative in most cases. Acyclovir reduces mortality and the frequency of residual neurologic sequelae, which occur in the large majority of untreated patients.

- [63] Answer D. Acetaminophen is metabolized by a variety of pathways, the most important of which is through the cytochrome P-450 system, which produces *N*-acetyl-*p*-benzoquinoneimine (NAPQI) which is the toxic metabolite causing hepatocyte necrosis. The drug *N*-acetylcysteine (NAC) reduces the amount of acetaminophen metabolized by this route by replenishing glutathione, the reducing agent which induces sulfation of acetaminophen to a nontoxic compound. Severity of acetaminophen overdose is measured by a 4-hour acetaminophen concentration as well as markers of liver damage, the most important of which is AST. Amylase and lipase are important indicators of pancreatic damage. Although GGT and alkaline phosphatase are present in the biliary ductal epithelium, they are less specific for hepatocellular damage than AST or ALT.
- [64] Answer A. Falls are the most common mechanism of traumatic injury in the elderly. Impaired balance and vision, medications, and orthostatic hypotension are some reasons for frequent falls in the elderly. Head trauma is the most important injury for the EP to evaluate in falls from standing height, and CT scan should be used liberally in these patients, even in the absence of hard neurologic findings. MVCs are the next most common cause of injury, and elderly patients in motor vehicle collision (MVCs) have a much higher risk of death than younger adults. Penetrating trauma is much less likely to occur in elderly patients compared with younger adults, but self-inflicted gunshot wounds in suicide attempts by the elderly carry almost 100% mortality. Elder abuse is underappreciated as a cause of injury in the geriatric population, but is unlikely to be as common as falls or MVCs.
- [65] Answer A. Urinary tract infection is generally divided into lower (cystitis) and upper (pyelonephritis) types. Symptoms of cystitis are almost always local—dysuria, increased frequency, urgency, hematuria, and suprapubic pain. Pyelonephritis is generally characterized by systemic symptoms, such as fevers, chills, and vomiting, as well as local symptoms of flank pain in the involved side. Clinically silent renal involvement may occur in patients without systemic symptoms, but adult patients with cystitis

almost never exhibit systemic symptoms. Systemic symptoms may occur in pediatric patients with cystitis alone.

- [66] Answer B. During the metabolism of ethylene glycol, glyoxylic acid is produced. Glyoxylic acid may be metabolized in three ways—two pathways form nontoxic compounds and the third forms the toxic oxalic acid, which predisposes to calcium oxalate crystals. Pyridoxine and thiamine are each cofactors in the two pathways that form nontoxic compounds and are recommended as supplemental therapy in addition to the standard treatment of ethylene glycol poisoning (bicarbonate, competitive alcohol dehydrogenase inhibitors such as alcohol or 4-methylpyrazole (Fomepizole), dialysis)
- [67] Answer C. Ocular antibiotics may be given by ointment or drops. Either form can cause systemic absorption and side effects. Drops usually require more frequent dosing due to a shorter duration of action. Ointments are easier to apply in pediatric patients for this reason. Antibiotics are indicated in most cases of conjunctivitis, as early presentations of bacterial cases may be clinically indistinguishable from viral ones.
- [68] Answer B. The most common causes of death in patients with acute renal failure are volume overload and hyperkalemia. Hyperkalemia can result in fatal dysrhythmias. Treatment involves correction of the renal insufficiency, potassium-binding resin, intravenous calcium for cardioprotection, bicarbonate, and insulin and glucose. Hypocalcemia, not hypercalcemia, occurs with acute renal failure due to decreased levels of activated vitamin D. Hypermagnesemia and hypernatremia may occur in renal failure but are usually clinically inconsequential. Hyperphosphatemia also occurs, but is usually adequately managed with correction of the renal failure and calcium antacids to bind excess gastrointestinal phosphate.
- [69] Answer D. Mallet finger is a disruption of the extensor tendon at the level of distal interphalangeal (DIP) joint with or without an associated avulsion fracture of the dorsal base of the distal phalanx. It is caused by a flexion force on the volar tip with an extended DIP joint. Conversely, jersey finger results from avulsion of the flexor digitorum profundus (FDP) tendon at the level of the DIP joint. It most commonly occurs when an extension force is applied to a flexed DIP such as occurs during tackling another player in football by grabbing his jersey. The ring finger is involved in 75% of cases. In contrast to the mallet finger, surgical repair is the treatment

of choice in nearly all cases. A Bennett fracture is an intra-articular fracture of the base of the thumb metacarpal (at the carpometacarpal joint) with lateral displacement and retraction of the distal segment due to the abductor pollicis longus. Such fractures require thumb spica splinting and frequently need operative fixation. Trigger finger refers to a stenosing flexor tenosynovitis typically due to overuse. It results in the formation of a nodule in the flexor tendon sheath, which prevents extension of the digit at the level of the MCP joint. It most commonly occurs in the ring and long fingers and local corticosteroid injection usually results in significant improvement. Patients should then be splinted in extension and referred to a hand specialist for further evaluation. Gamekeeper's thumb is an avulsion injury of the ulnar collateral ligament (UCL) at the thumb-MCP joint. It most commonly occurs during a skiing accident in which a patient's thumb is trapped in the loop of the pole, resulting in forced abduction and extension of the thumb. An avulsion fracture may also occur at the site of the UCL insertion. Patients should be placed in a thumb spica splint and referred to a hand surgeon for further evaluation. Volar plate entrapment may occur with dorsal PIP dislocations preventing ED reduction.

70 Answer B. Neither antibiotics nor corticosteroids have any role in prophylactic therapy of potential aspiration. Corticosteroids may be of use in patients with a history of reactive airway disease, who have active symptoms upon presentation to the ED. Otherwise, asymptomatic patients should be observed for a minimum of 4 hours in the ED. Repeat x-rays are not required. If the patient remains asymptomatic and maintains an oxygen saturation >94% without supplemental oxygen, she may be safely discharged.

71 Answer A. Due to decreased plasma volume, the hematocrit increases approximately 2% for every 1°C decrease in the core temperature. This is thought to be due to increased vascular permeability and third spacing of fluids as well as cold-induced diuresis and free water loss. In acute hypothermia in otherwise healthy individuals, hyperglycemia occurs because of circulating catecholamines and cold-related inhibition of insulin secretion. There is a tendency toward metabolic acidosis in hypothermic patients although limited experimental data suggest that patients may present either acidotic or alkalotic. Patients experience respiratory depression with decreasing temperature, in part due to the decrease in metabolism that occurs as the body cools. This raises the P_{CO_2} and decreases the pH. Other factors that contribute to an acidotic state include lactate

production from shivering and decreased tissue perfusion and impaired hepatic function. These effects are blunted somewhat because of the fact that as blood cools, it becomes more alkalotic. A progressive diuresis, not oliguria, occurs as the temperature cools. The most common neurologic finding in hypothermic patients is a decreased level of consciousness. EEGs in hypothermic patients demonstrate generalized slowing and decreased amplitude. In addition, pupillary responses and deep tendon reflexes are decreased and patients tend to have increased muscle tone.

72 Answer C. Spontaneous remission is the rule in trigeminal neuralgia as >50% of patients will experience a remission for 6 months. Antiherpes virus medications and corticosteroids should be used for patients with postherpetic neuralgia. This is a separate entity from trigeminal neuralgia and patients should not be placed on antiherpes virus medicines unless they have a history of herpes zoster (shingles) involving the face. All patients with trigeminal neuralgia should be referred to a neurologist for further evaluation. Up to 2% to 4% of patients with trigeminal neuralgia also have multiple sclerosis and up to 10% of patients have an intracranial lesion. Therefore, all such patients should receive an MRI on an outpatient basis. Unfortunately, roughly 30% of patients will fail medical therapy and require surgical ablation. Phenytoin is not indicated for trigeminal neuralgia. Carbamazepine is the standard front-line agent, and is started at 100 mg b.i.d.

73 Answer A. Acute spinal cord compression due to vertebral column metastasis occurs with many cancers, including lung, breast, and prostate. Patients present with typical findings of epidural compression, including pain, weakness, or bowel/bladder dysfunction. Any patient suspected of having metastatic epidural compression should have an emergent MRI of the spine to evaluate the symptoms. Rapid diagnosis and management is essential to prevent irreversible neurologic sequelae. Corticosteroids may be started in the ED to reduce edema of the spinal cord. Radiation and spinal surgery are the primary treatments of malignancy-related epidural cord compression. Other specialties need not be emergently consulted in these cases.

74 Answer C. The patient has evidence of methemoglobinemia, with cyanosis, unresponsive hypoxemia on pulse oximetry, and dark-colored blood. Oxidation of iron from the ferrous to the ferric state prevents hemoglobin from carrying oxygen. Among the answer choices, amyl nitrate is most likely to cause methemoglobinemia. Co-oximetry must be

performed to accurately calculate the oxygen saturation. Treatment is with methylene blue to reduce methemoglobin back to hemoglobin. Lorazepam, like other benzodiazepines, may cause sedation and hypotension. Dextromethorphan may cause an opioid toxidrome with sedation, constricted pupils, and respiratory depression. Diphenhydramine causes an anticholinergic state, with sedation, tachycardia, dry mucous membranes, and mydriasis. Ketamine causes a dissociated state of altered mental status with preserved respiratory reflexes.

- 75** Answer A. The most common complication of mitral stenosis (MS) is atrial fibrillation, which puts the patient at high risk for thrombus formation and embolism. Atrial fibrillation occurs due to the severe atrial hypertrophy that results from the stenosed mitral valve preventing flow into the left ventricle.
- 76** Answer C. The development of a lung abscess is most commonly a consequence of aspiration in patients with poor oral hygiene. Less commonly, it may occur as a result of necrotizing pneumonia. Classically it has been thought that anaerobic bacteria are responsible for the great majority of lung abscesses. However, recent studies have revealed that the microbiology may differ between immunocompetent and immunocompromised patients. Although anaerobes are predominant in immunocompetent patients, patients with depressed immune systems are more frequently infected with aerobic bacteria such as *S. aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, and *H. influenzae*. Frequently, however, infections are polymicrobial. Nonbacterial organisms such as fungi and parasites may also cause lung abscesses. *S. pneumococcus* is not a common cause. Patients with anaerobic or fungal lung abscesses typically experience an indolent course of fever, productive cough, night sweats, anorexia, and weight loss. The sputum is classically malodorous, which should be a clue to the diagnosis. Immunocompromised patients presenting with a lung abscess as a result of aerobic necrotizing pneumonia present with acute symptoms of pneumonia and may be quite ill. Chest radiography typically reveals a cavitary lesion with an air-fluid level. Antibiotics remain the cornerstone of therapy although surgical management may ultimately be necessary. Typical surgical indications are medical treatment failure, suspected cancer, or congenital lung malformation. Lung abscesses very rarely develop in the setting of pediatric community-acquired pneumonia (CAP) and only occur typically in patients who are immunocompromised because of acquired immune deficiencies, malignancy or chemotherapy, and in patients who are predisposed to aspiration (children with neurologic

disorders, decreased mental status, impaired cough, or swallowing dysfunction).

- 77** Answer A. Hyponatremia is almost always caused by the loss of free water and rarely by sodium gain (which is usually iatrogenic). Regardless of the underlying cause, it almost never occurs in alert patients with an intact thirst mechanism. It is a known complication of multiple doses of activated charcoal, occurring in 6% of patients receiving such therapy. Treatment with saline should only occur in patients who have hemodynamic compromise. Almost all patients, however, require treatment with half-normal saline or more dilute solutions with lower tonicity. The main complication of therapy is cerebral edema, so the rate of correction should be 0.5 to 1.0 mEq/L/hour on average (though it may be more rapid for the initial few hours if the patient is suffering life-threatening complications of hyponatremia). Central pontine myelinolysis is a complication of therapy for hyponatremia.
- 78** Answer C. More than 90% of cases of hypercalcemia are caused by primary hyperparathyroidism or malignancy. Most cases of primary hyperparathyroidism are caused by benign parathyroid adenomas. Malignant causes of hypercalcemia occur either through osteolytic metastatic lesions as in breast cancer or melanoma or through secretion of parathyroid hormone-related peptide (PTHrP) as in squamous cell carcinoma or renal cell carcinoma.
- 79** Answer E. Lymphedema or lymphatic disruption as occurs after mastectomy or saphenous vein harvest puts patients at increased risk for infection. Patients with diabetes have an increased susceptibility to cellulitis due to their generalized immunocompromised state. Drug abusers engaging in skin popping may develop cellulitis due to a variety of unusual pathogens in addition to *S. aureus*.
- 80** Answer F. Rust rings are the result of iron-containing foreign bodies leaving a residue on the cornea. Patients should see the ophthalmologist within 48 hours, as the ring will migrate to more superficial corneal layers over time, allowing for easier removal. Topical steroids have no role in the management of rust rings or ocular foreign bodies. Metallic foreign body evaluation of the eye with MRI is absolutely contraindicated.
- 81** Answer B. Digitalis toxicity causes lethal dysrhythmias, and treatment involves management of electrolytes, digitalis antibody (Fab) fragment therapy, and dialysis. The most important indications for Fab fragment therapy in acute digitalis toxicity

are hyperkalemia, ventricular dysrhythmias, and co-ingestions of other cardiotoxic drugs. Elevated digoxin level and massive ingestion are other relative indications, but usually mandate additional rhythmic disturbance to warrant Fab fragment therapy. Supraventricular dysrhythmias are only an indication for Fab fragment therapy if the patient is hemodynamically unstable. Magnesium level aberrations may exacerbate hypokalemia or hyperkalemia, but in the absence of potassium abnormalities, they do not constitute an indication for Fab fragment therapy.

82 Answer B. With the history of a recent camping trip, tick-borne illness should be suspected. In this case, the patient likely has Rocky Mountain spotted fever, caused by the intracellular bacterium, *Rickettsia rickettsii*. The organism causes endothelial cell damage, resulting in diffuse vasculitis and multiple organ microinfarctions and failure. Acute respiratory distress syndrome, disseminated intravascular coagulation (DIC), and shock all may occur in serious cases. Rash on the wrists and ankles following a nonspecific viral-like syndrome is characteristic. Laboratory work is usually normal, though thrombocytopenia may occur. Treatment is with doxycycline or chloramphenicol. Choices A, C, D, and E will not adequately treat the rickettsial infection.

83 Answer B. Neutropenic fever patients are at considerable risk for serious bacterial infection and require broad-spectrum antibiotics. Either gram-positive (*Streptococcus* or *Staphylococcus* species) or gram-negative (*Pseudomonas*, *E. coli*, and others) organisms can be responsible for infection. Cefepime monotherapy is an appropriate initial antibiotic choice, covering all organisms except for some strains of methicillin-resistant *Staphylococcus aureus* (MRSA). Vancomycin may be added to any antibiotic regimen to adequately cover MRSA in hospitals with a high incidence of this pathogen. Doxycycline covers some gram-positive organisms and atypicals, but does not adequately cover gram negatives. Clindamycin does not cover gram-negative organisms. The combination of metronidazole and either gentamicin or aztreonam leaves out adequate gram-positive coverage.

84 Answer B. Xanthochromia refers to the presence of a yellowish color to the supernatant of centrifuged cerebrospinal fluid (CSF) samples. It results from the breakdown of hemoglobin first to oxyhemoglobin and then to bilirubin. Methemoglobin may also be produced, but, like bilirubin, it occurs after oxyhemoglobin is generated. These latter molecules have a yellowish tint and characteristic spectrophotometric absorption curves. Traditionally, oxyhemoglobin was

thought to appear within 2 hours of subarachnoid hemorrhage (SAH) achieving a peak concentration between 24 and 46 hours. Bilirubin does not appear until approximately 10 hours after SAH. Although the presence of xanthochromia remains the most reliable method for differentiating between a traumatic lumbar puncture and an SAH, its presence is not pathognomonic for SAH. Recent studies have demonstrated that xanthochromia begins to develop immediately after mixing of blood and CSF as seen in traumatic lumbar puncture. The degree of xanthochromia correlates with the amount of bleeding induced by trauma. Clinically, recent studies have established that in the presence of a traumatic lumbar puncture and an RBC concentration of 10,000 RBC per μL , xanthochromia cannot be reliably used to confirm SAH. Conversely, xanthochromia in the setting of RBC concentrations $<5,000$ RBC per μL is a reliable indicator of SAH. The method of comparing RBC counts in the first and fourth tubes has been shown to be an unreliable means of differentiating these two entities. None of the other methods listed has been shown to be reliable.

85 Answer D. Disseminated intravascular coagulation (DIC) is an acquired consumptive coagulopathy which may occur in patients who are critically ill. Disorder of the clotting cascade causes platelets and clotting factors to be consumed, leading to both hemorrhagic and thrombotic complications. Almost all have decreased levels of clotting factors, leading to prolongation in the prothrombin and partial thromboplastin times. Fibrinolysis occurs commonly, leading to decreased fibrinogen levels and an increase in fibrin split products. Acute anemia may not always occur, as some patients have relatively low hemorrhagic burden and hemoglobin levels may take time to equilibrate and not show subtle, acute decreases.

86 Answer B. The most commonly affected joints in septic arthritis are the knee (40% to 50%), hip (13% to 20%), shoulder (10% to 15%), ankle (6% to 8%), wrist (5% to 8%), and elbow (3% to 7%).

87 Answer E. Compartment syndrome refers to ischemia that occurs in the extremities when pressure in the soft tissues exceeds that of the microcirculation. Such high pressures occur from either increased contents in the compartment or external compression. Normal compartment pressure is zero, and pressures >30 mm Hg are usually enough to predispose to compartment syndrome. Long bone fractures are the usual reason for compartment syndrome, causing extravasated blood and soft tissue edema to accumulate. The most common symptoms are pain and

paresthesias. Diminished pulses generally occur only in extremely advanced cases, as pressure in compartment syndrome is usually well below arterial pressure. For this reason, ankle-brachial indices are usually normal in compartment syndrome unless there is simultaneous arterial insufficiency. Outpatient follow-up in cases of suspected compartment syndrome is contraindicated. Imaging may help delineate the cause of the compartment syndrome, but diagnosis is still clinical. Diagnosis is made by directly measuring compartment syndromes with a Stryker needle device. Treatment is with urgent fasciotomy.

88 Answer B. Fat embolism can occur after fracture of any long bone, usually in the lower extremities. Fat droplets from the bone marrow reach the systemic circulation and can embolize to the lungs, brain, eyes, and extremity microvasculature. Respiratory distress, altered mental status, fever, and petechiae commonly occur. Diagnosis is aimed at ruling out other causes of symptoms, and treatment is primarily supportive. Meningococemia can occur acutely and cause altered mental status and petechiae, but the history of the leg fracture and the respiratory distress point away from this. Pulmonary embolism (PE) due to thrombus can occur in the posttrauma patient but usually occurs later in the course of the recovery. Pneumothorax and pneumonia in a previously healthy patient are unlikely to cause altered mental status or petechiae.

89 Answer D.

90 Answer C. Coral snakes are part of the family, Elapidae, whereas the remaining snakes listed are part of the family, Crotalidae. Elapidae venom is neurotoxic, as several of the venom components block acetylcholine transmission. In contrast to victims of pit viper envenomation, victims of coral snake envenomation usually experience minimal pain and swelling at the bite site. However, signs of neurotoxicity may develop rapidly or be delayed for up to 12 hours. Ptosis is frequently the initial sign of neurotoxicity and may be followed by delirium, tremors, drowsiness, hypersalivation, and multiple cranial nerve abnormalities (dysarthria, diplopia, and dysphagia). In severe envenomations, respiratory muscle paralysis occurs leading to respiratory failure and death.

91 Answer B. Parental smoking, male gender, bottle propping, Down's syndrome and facial anatomic abnormalities are the commonly implicated risk factors for developing otitis media.

92 Answer A. This patient has Henoch-Schönlein purpura (HSP), a small-vessel vasculitis that primarily affects children who present with palpable purpura, arthralgias, abdominal pain, and glomerulonephritis. Purpura is present in 100% of patients, although 75% of patients have arthralgias, typically of the ankles, 65% have abdominal pain, and 40% have renal involvement. Prognosis depends on the presence and severity of renal involvement. Colicky abdominal pain is the most common gastrointestinal manifestation, though vomiting, bleeding, and more rarely, intussusception, may occur. In contrast to the typical ileocolic intussusception that occurs in the general population, patients with HSP experience ileoileal intussusception 70% of the time. In the absence of renal disease, HSP is self-limited and only supportive care is required. In the setting of hematuria or proteinuria, corticosteroids may be beneficial but renal consultation should be sought. When present in adults, HSP is a much more severe disease due to the increased frequency and severity of nephritis. (Figure reprinted with permission from Fleisher GR. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003.)

93 Answer B. Significant renal injury in blunt trauma rarely occurs in the absence of other organ injury. Gross hematuria is the standard indication for further evaluation of the urologic tract, and CT scan with IV contrast is the best imaging tool to evaluate renal injuries. In stable patients with microscopic hematuria due to blunt trauma, significant renal injury almost never occurs and should not be pursued. Penetrating trauma to the back or abdomen may cause renal injury in the absence of either gross or microscopic hematuria and should aggressively be evaluated, either with CT scan or laparoscopy. The vast majority of renal injuries do not require operative management; exceptions include large renal lacerations and major vascular injuries. The kidneys are among the most commonly injured abdominal organs in blunt abdominal trauma in children.

94 Answer A. The kidneys are almost wholly responsible for magnesium excretion and are able to enhance excretion in the setting of a magnesium load. Therefore, in the absence of renal insufficiency, hypermagnesemia rarely occurs. Abuse of magnesium-containing laxatives may cause a transient increase in magnesium levels but will not persist in the setting of normal renal function. Trauma could feasibly lead to hypermagnesemia if associated with rhabdomyolysis.

- 95** Answer E. The patient presents after benzodiazepine overdose and may or may not have co-ingested alcohol. The history of chronic alcohol use and altered mental status dictates the use of thiamine therapy, along with folate, multivitamin, magnesium, and dextrose. Fomepizole is indicated only in cases of toxic alcohol poisoning. Flumazenil, a specific benzodiazepine antagonist, is contraindicated here, as it can precipitate withdrawal seizures in patients who are chronically using benzodiazepines. Physostigmine is an acetylcholinesterase inhibitor used in selected patients with anticholinergic toxicity. Glucagon is used in patients with β -blocker and calcium channel blocker toxicity.
- 96** Answer D. Pneumothorax, pneumomediastinum, subcutaneous emphysema, and subconjunctival hemorrhage are all complications related to the acute elevations in intrathoracic pressure during an asthma exacerbation. Pressures may be further exaggerated by fits of coughing which may accompany an asthma exacerbation. MIs may occur in patients who have underlying cardiac disease, as severe asthma exacerbations place an extensive demand on the heart. Furthermore, patients with severe asthma attacks may be hypoxic for a period of time resulting in cardiac ischemia as oxygen supply is outstripped by demand. Pulmonary emboli are not related to asthma exacerbations.
- 97** Answer A. After the primary survey, radiographs of the chest and pelvis are indicated to rule out important causes of immediate death, including pneumothorax, hemothorax, and pelvic fracture. Ultrasonography in the form of a focused assessment of sonography in trauma (FAST) scan may also be performed to evaluate for significant intraperitoneal hemorrhage. After these initial studies are performed (or in conjunction with them) the secondary survey is conducted to identify injuries that may cause significant morbidity without mortality. Obvious external injuries may distract the trauma leader from identifying the immediate life threat. In this patient's case, the broken right ankle, though impressive, is unlikely to be the cause of death. If the initial chest x-ray is omitted, however, the potential pneumothorax missed on physical examination may be lethal. This is the main reason for the stepwise, algorithmic approach to trauma which is targeted to identify immediate life threats first and other injuries later. Cervical spine radiographs may be left until after the secondary survey, assuming appropriate spine precautions are used when moving the patient. CT scans should not be initiated until the primary and secondary surveys are complete, except in special circumstances of isolated, severe head injury.
- 98** Answer E. Hypothermia is one of the most common manifestations of severe hypothyroidism (e.g., myxedema) although body temperature is rarely $<95^{\circ}\text{F}$. In the setting of myxedema, a "normal" temperature should trigger a search for a focus of infection. Nonpitting edema is due to hyaluronic acid deposition and is initially found in the periorbital region. Pseudomyotonic or "hung up" reflexes are another common finding (delayed relaxation phase of deep tendon reflexes). Paresthesias are present in $>80\%$ of patients and median nerve neuropathy (carpal tunnel syndrome) is the most common manifestation.
- 99** Answer C. The x-ray demonstrates a Salter-Harris III fracture of the distal radius. The Salter-Harris classification is used to describe pediatric long bone fractures near the growth plate. Type I fractures go through the physis only, type II from the metaphysis into the physis, type III from the epiphysis into the physis, type IV is a combination of types II and III, and type V is a crush injury to the physis. The most common is type II. Types I and V may be invisible on initial plain films. Type V carries the poorest prognosis. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004.)
- 100** Answer C. Patients with HHS have a larger fluid deficit and more significant potassium deficiency than patients with diabetic ketoacidosis (DKA). Although seizures may occur in HHS, the most common immediate life threat is hypovolemic shock. Hypokalemia is the next most serious immediate risk to patients with HHS. Thromboembolic events may occur in either DKA or HHS, but more commonly complicate HHS. Thromboembolic events occur as a result of severe dehydration and resulting hyperviscosity.

Test 9



Questions

1 Which of the following is true regarding adult epiglottitis?

- (A) Airway obstruction is usually caused by inflammation of the infraglottic tissues.
- (B) Drooling and stridor are infrequent presenting signs.
- (C) The disease is more common in winter.
- (D) Nebulized racemic epinephrine has been shown to decrease the need for intubation.
- (E) Normal lateral neck x-rays can safely exclude epiglottitis.

2 A 46-year-old male golfer suffered a snakebite on his hand while he was looking for his golf ball in the brush. His friend snapped a picture of the snake and brings it in for you to examine. He has almost no pain or swelling at the bite site but he presented for evaluation as he had never been bitten by a snake before. Which of the following is the next best step in management (Fig. 9-1)?

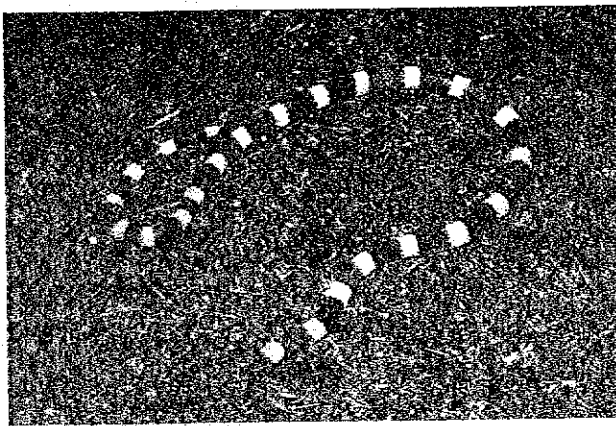


Figure 9-1.

- (A) The patient should be observed for a minimum of 6 hours and then discharged if he remains asymptomatic.

- (B) The patient should immediately receive crotalidae polyvalent immune fab ovine (CroFab) antivenin.
- (C) The wound should be irrigated with sterile saline and a sterile suction catheter to help remove venom.
- (D) The patient should immediately receive North American coral snake antivenin.
- (E) The patient should receive an intramuscular mixture of antivenins as close to the bite site as possible.

3 A 74-year-old man with a history of hyperlipidemia is brought in by emergency medical services (EMS) with an acute ischemic right hemispheric stroke. Soon after returning from CT, he has a generalized seizure which terminates without treatment after 1 minute. Which of the following is true about this patient?

- (A) The patient should have been treated with prophylactic phenytoin as soon as the diagnosis of ischemic stroke was made.
- (B) The patient should be given a loading dose of phenytoin after his seizure.
- (C) Status epilepticus occurs more commonly in the setting of ischemic strokes than in other settings.
- (D) Phenytoin is contraindicated in patients with ischemic stroke due to its potential for causing ataxia.
- (E) Although isolated seizures are common in patients with ischemic strokes, treatment with antiepileptic drugs is unnecessary because recurrence is uncommon.

4 What is the half-life of carboxyhemoglobin with a 100% oxygen nonrebreather mask?

- (A) 6 hours
- (B) 3 hours
- (C) 90 minutes

- (D) 60 minutes
- (E) 30 minutes

- 5 Retrobulbar hemorrhage can result in what devastating complication?
- (A) Corneal abrasion
 - (B) Hypopyon
 - (C) Central retinal artery occlusion (CRAO)
 - (D) Hyphema
 - (E) Corneal ulcer
- 6 The pictured deformity in Fig. 9-2 occurs in:

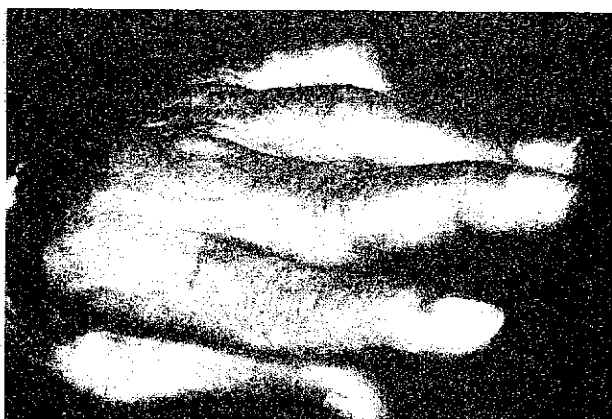


Figure 9-2.

- (A) Rheumatoid arthritis.
 - (B) Osteoarthritis.
 - (C) Systemic lupus erythematosus.
 - (D) Reiter's syndrome.
 - (E) Psoriatic arthritis.
- 7 Which of the following is an ingredient in sitz baths?
- (A) Baking soda
 - (B) Salicylate
 - (C) Corticosteroids
 - (D) Insoluble fiber
 - (E) None of the above
- 8 A 12-year-old boy presents with progressive testicular swelling. Testicular examination is shown in Figure 9-3. Which of the following is the most common complication of this condition?
- (A) Testicular torsion
 - (B) Epididymitis
 - (C) Infertility
 - (D) Malignancy
 - (E) Deep venous thrombosis



Figure 9-3.

- 9 A 27-year-old man presents to the ED with pruritus ani, tenesmus, and yellowish mucoid discharge from his rectum. Upon further questioning, he acknowledges recent unprotected anal intercourse. The recommended regimen for treating this patient is
- (A) Topical podophyllin b.i.d. \times 7 days.
 - (B) Ceftriaxone 125 mg IM plus doxycycline 100 mg PO b.i.d. \times 7 days.
 - (C) Valacyclovir 1 g PO daily \times 5 days.
 - (D) Benzathine penicillin G 2.4 million units IM \times 1 dose.
 - (E) Lopinavir.
- 10 Patients with inflammatory bowel disease (IBD) may develop which of the following extraintestinal complications?
- (A) Arthralgias
 - (B) Episcleritis
 - (C) Cholelithiasis
 - (D) Pyoderma gangrenosum
 - (E) All of the above
- 11 A 62-year-old man with a history of chronic alcoholism presents with acute-onset epigastric

abdominal pain. Initial labs reveal a white blood cell (WBC) count of 19,000 per mm^3 , a normal chemistry with a glucose value of 168 mg per dL, a lactate dehydrogenase (LDH) of 400 IU per L, liver enzymes demonstrating an aspartate aminotransferase (AST) of 137 SF units and an alanine aminotransferase (ALT) of 94 SF units, and a lipase level that is five times the lab's upper limit of normal. You admit him with a diagnosis of acute pancreatitis. Which of the following is true?

- (A) He has 0 Ranson's criteria upon admission.
- (B) He has 1 Ranson's criteria upon admission.
- (C) He has 2 Ranson's criteria upon admission.
- (D) He has 3 Ranson's criteria upon admission.
- (E) His elevated WBC count suggests an infectious etiology

12 The most common complication of peptic ulcer disease (PUD) is

- (A) Perforation.
- (B) Gastric adenocarcinoma
- (C) Gastrointestinal bleeding.
- (D) Obstruction.
- (E) Penetration into an adjacent organ.

13 Which of the following is true regarding treatment for acute aspirin toxicity?

- (A) A urinary pH goal of 7.5 to 8 is desirable.
- (B) Forced diuresis is an effective adjunctive therapy.
- (C) Activated charcoal is ineffective.
- (D) Whole bowel irrigation is contraindicated.
- (E) Hemodialysis plays no role in management.

14 Which of the following deficits below the level of injury is consistent with an anterior cord syndrome?

- (A) Loss of total sensation and motor function.
- (B) Bladder and bowel incontinence and loss of motor function.
- (C) Loss of motor function only.
- (D) Loss of vibration and position sensation and motor function.
- (E) Loss of pain and temperature sensation and motor function.

15 Which of the following represents the approximate proportion of acute myocardial infarctions (MIs) that occur without a history of chest pain?

- (A) 1%
- (B) 5%
- (C) 10%
- (D) 25%
- (E) 50%

16 A 22-year-old man presents with an episode of left-sided chest pain that lasted 4 hours, but resolved an hour ago. The pain was dull and radiated to his left shoulder. The patient states that he used cocaine at a party 12 hours ago. Physical examination is unremarkable and vital signs are normal. The electrocardiogram (EKG) is shown in Figure 9-4. Which of the following is most appropriate at this time?

- (A) Nitroglycerin
- (B) Metoprolol
- (C) Morphine
- (D) Aspirin
- (E) Tissue plasminogen activator (tPA)

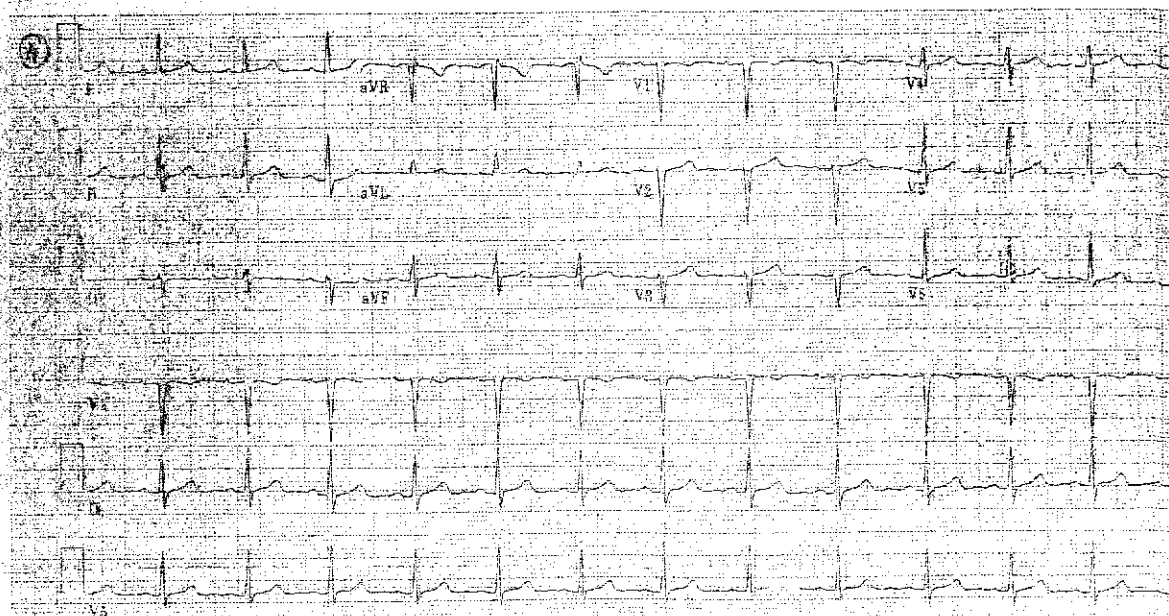


Figure 9-4. (See color insert.)

- 17** A 3-year-old boy had a ventriculoperitoneal shunt (VPS) placed at 22 months due to hydrocephalus. It has not been revised since then and he has had no problems with it. He is now brought to the ED with a history of fever of 38.2°C, headache, and "fussiness." Which of the following is true about this patient?
- (A) The risk of VPS infection rises 1 year after insertion.
 - (B) Urgent lumbar puncture is indicated.
 - (C) The mortality of a VPS infection is roughly 75%.
 - (D) Hydrocephalus on CT scan rules out the presence of VPS infection.
 - (E) Most patients with a VPS infection have peripheral leukocytosis.
- 18** An 85-year-old woman presents with right shoulder stiffness. She was diagnosed with a shoulder sprain 3 weeks ago after a fall, and has been wearing a sling since then. Physical examination demonstrates an afebrile patient with restricted range of motion of the shoulder in all directions with mild pain. Which of the following is the most likely diagnosis?
- (A) Rotator cuff tear
 - (B) Adhesive capsulitis
 - (C) Septic arthritis
 - (D) Associated scapular fracture
 - (E) Rheumatoid arthritis
- 19** Which of the following is the most common serious complication of the edrophonium (Tensilon) test?
- (A) Bradycardia
 - (B) Atrial fibrillation
 - (C) Oculogyric crisis
 - (D) Cough
 - (E) Seizure
- 20** Which of the following is associated with carpal tunnel syndrome?
- (A) Hypertension
 - (B) Diabetes
 - (C) Congestive heart failure
 - (D) Coronary artery disease
 - (E) Osteogenesis imperfecta
- 21** A 50-year-old man develops acute onset of severe right flank pain. A CT scan demonstrates a passed kidney stone in the bladder. The patient has never had a kidney stone before. He asks you what his risk of getting another stone is. You tell him that the lifetime risk of recurrence is approximately:
- (A) <1%.
 - (B) 10%.
 - (C) 25%.
 - (D) 50%.
 - (E) >99%.
- 22** Which of the following is true regarding post-MI pericarditis?
- (A) It occurs in a majority of patients with MI.
 - (B) Concave ST-elevations are usually seen on EKG.
 - (C) Treatment generally involves nonsteroidal anti-inflammatory drug (NSAID) therapy.
 - (D) A pericardial friction rub is almost never audible.
 - (E) Etiology is likely infectious.
- 23** After physiologic jaundice of the newborn (icterus neonatorum), which of the following is the most common cause of neonatal jaundice?
- (A) Breast milk jaundice
 - (B) Cephalohematoma
 - (C) Sickle cell anemia
 - (D) Gilbert's syndrome
 - (E) Biliary atresia
- 24** Erosion into the carotid artery is most commonly a complication of which of the following?
- (A) Ludwig's angina
 - (B) Parapharyngeal abscesses
 - (C) Peritonsillar abscesses
 - (D) Retropharyngeal abscesses
 - (E) Epiglottitis
- 25** A 55-year-old man presents with right arm and leg weakness and left-sided facial droop. Which of the following arteries is most likely involved?
- (A) Anterior cerebral artery
 - (B) Anterior communicating artery
 - (C) Middle cerebral artery
 - (D) Posterior cerebral artery
 - (E) Basilar artery
- 26** Which of the following is the most common arrhythmia in patients with pulmonary embolism (PE)?
- (A) Multifocal atrial tachycardia
 - (B) Sinus tachycardia
 - (C) Atrial fibrillation
 - (D) Sinus rhythm with atrial premature contractions
 - (E) Ventricular fibrillation
- 27** Which of the following is true regarding the use of corticosteroids in asthma management?
- (A) IV corticosteroids have been proved to be of greater efficacy than oral corticosteroids.

- (B) Discharged patients who have received systemic corticosteroids in the ED require tapered oral corticosteroids therapy as an outpatient for up to 10 days.
- (C) Long-term systemic corticosteroid use may be complicated by weight gain, aseptic necrosis of the femur, and peptic ulcer disease (PUD).
- (D) Inhaled corticosteroids are not useful for long-term asthma control.
- (E) The onset of action of IV corticosteroids is within 1 hour.
- 28** Which of the following patients with febrile seizure should receive a lumbar puncture to look for infectious source?
- (A) A 10-month-old
- (B) An 18-month-old
- (C) A 2-year-old
- (D) A 4-year-old
- (E) A 5-year-old
- 29** A 5-year-old boy presents with confirmed rotavirus diarrhea. He is tachycardic and lethargic with sunken eyes, poor skin turgor, and dry mucous membranes. Which of the following is the most appropriate next step in management?
- (A) 0.45 NS 100 mL per hour drip
- (B) 0.45 NS 10 mL per kg bolus
- (C) 0.9 NS 100 mL per hour drip
- (D) 0.9 NS 10 mL per kg bolus
- (E) 0.9 NS 20 mL per kg bolus
- 30** The most common cause of death in recipients of a solid-organ transplant is
- (A) Recurrent organ failure.
- (B) Infection.
- (C) Drug toxicity.
- (D) Organ rejection.
- (E) Effects of the primary disease process.
- 31** A 44-year-old man with AIDS presents with chronic diarrhea, flatulence, and generalized malaise for one month. Which of the following is the most likely cause of his symptoms?
- (A) *Cryptosporidium* spp.
- (B) *Campylobacter* spp.
- (C) *Giardia lamblia*
- (D) *Escherichia coli*
- (E) *Enteromonas hominis*
- (C) Glaucoma
- (D) Lens dislocation
- (E) Corneal ulcer
- 33** Which of the following represents the correct medial to lateral configuration of permanent teeth?
- (A) Canine, central incisor, lateral incisor, premolar, molar
- (B) Central incisor, lateral incisor, premolar, molar, canine
- (C) Central incisor, lateral incisor, canine, premolar, molar
- (D) Premolar, molar, canine, lateral incisor, central incisor
- (E) Premolar, molar, central incisor, lateral incisor, canine
- 34** Which of the following is true regarding perimortem cesarean section?
- (A) The fetus should be delivered within 5 minutes of maternal cardiac arrest.
- (B) Family consent should be obtained before the procedure.
- (C) It should only be performed if the fetal age is determined to be >20 weeks' gestation.
- (D) A low horizontal abdominal incision affords the best opportunity for fetal recovery.
- (E) A lateral approach is best in cases of a suspected anterior placenta.
- 35** A 6-year-old boy presents with left hip pain and limp. There is no history of trauma. The pain is relieved by rest. Plain radiographs are shown in Fig. 9-5. Which of the following is true regarding this condition?

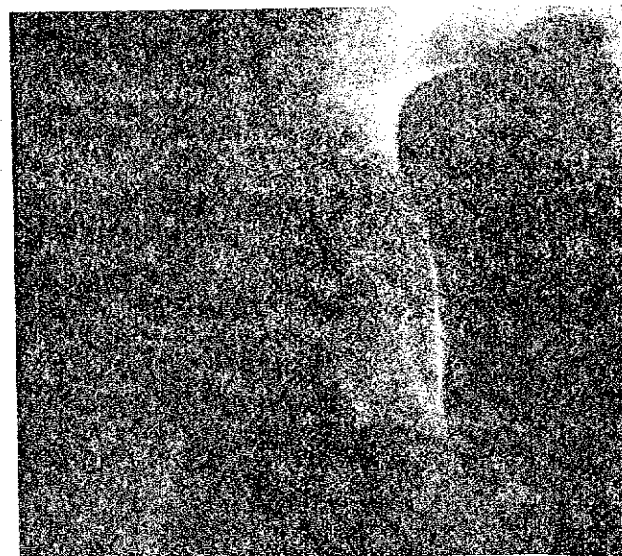


Figure 9-5.

- (A) It is much more common in boys than in girls.
- (B) It is usually bilateral.
- (C) Etiology is viral in half of all cases.
- (D) Almost all patients require surgical fixation.
- (E) Joint aspiration confirms the diagnosis.

36 A 22-year-old woman presents with a severe sore throat and difficulty swallowing. Her physical examination is consistent with pharyngitis. Which of the following criteria make group A streptococcus (GAS) more likely as a cause of her illness?

- (A) Tender anterior cervical lymphadenopathy
- (B) Concomitant otitis media
- (C) Nonexudative tonsillitis
- (D) The presence of a cough
- (E) Increased atypical lymphocytes on her peripheral blood smear

37 A 62-year-old man presents with right eyelid swelling and crusting. He reports no pain or redness in the eye itself. Physical examination of the eyelid is shown in Figure 9-6. Which of the following is the most appropriate therapy?



Figure 9-6.

- (A) Topical erythromycin
- (B) Topical prednisolone
- (C) Topical proparacaine
- (D) Intravenous ceftriaxone
- (E) Intravenous acetazolamide

38 The main problem posed by breech presentations is

- (A) Inadequate cervical dilation.
- (B) Entrapment of the fetal head.
- (C) Umbilical cord prolapse.
- (D) Fetal spinal cord injuries.
- (E) All of the above.

39 A 22-year-old man presents with forearm pain after being assaulted. Radiographs demonstrate a proximal ulnar fracture with dislocation of the radial head. Which of the following is the most likely nerve injury?

- (A) Median
- (B) Radial
- (C) Ulnar
- (D) Axillary
- (E) Sciatic

40 Which of the following is true regarding osteomyelitis?

- (A) Patients usually appear toxic.
- (B) The sensitivity of erythrocyte sedimentation rate (ESR) is 50%.
- (C) The sensitivity of radiographs is higher early in the illness than later on.
- (D) CT is superior to MRI for diagnosis.
- (E) *Staphylococcus aureus* is the most common cause.

41 Which of the following is true regarding intussusception?

- (A) Thirty percent of all cases of intussusception occur in adults.
- (B) Children with intussusception are more likely to have an anatomic abnormality of the intestine than adults.
- (C) The classic triad of abdominal pain, vomiting, and bloody stools occurs in the majority of patients.
- (D) Ultrasonography is the most useful noninvasive means of diagnosing intussusception.
- (E) All of the above.

42 Of the following, which is the strongest risk factor for an ectopic pregnancy?

- (A) Prior ectopic pregnancy
- (B) History of pelvic inflammatory disease (PID)
- (C) Current use of an intrauterine device (IUD)
- (D) Prior C-section
- (E) Oral contraceptives

43 A 23-year-old woman with sickle cell disease presents with pain in her right shin and fevers for 2 weeks. She never has leg pain with her sickle cell pain crises. An x-ray demonstrates evidence of osteomyelitis. Which of the following is the most likely etiologic agent?

- (A) *S. aureus*
- (B) *Salmonella*
- (C) *Aspergillus*
- (D) *Neisseria gonorrhoeae*
- (E) *Pseudomonas*

- 44 Which of the following is true regarding myasthenia gravis (MG) and Lambert-Eaton myasthenic syndrome (LEMS)?
- (A) Ocular muscle weakness is the most common initial presentation in both MG and LEMS.
 - (B) Autonomic dysfunction is a common finding in MG but not in LEMS.
 - (C) Colon cancer is the most common neoplastic disease associated with LEMS.
 - (D) The distinguishing feature of LEMS is proximal muscle weakness that is most prominent in the lower extremities.
 - (E) Deep tendon reflexes (DTRs) in both MG and LEMS tend to be preserved.
- 45 Which of the following is more characteristic of subdural hematoma than epidural hematoma?
- (A) Lucid interval
 - (B) Coma
 - (C) Focal neurologic deficits
 - (D) Increased intracranial pressure
 - (E) Delayed presentation
- 46 Which of the following is true regarding traumatic hemothorax?
- (A) Continuous chest tube output of 300 mL per hour for 4 hours is an indication for thoracotomy.
 - (B) Costophrenic angle blunting occurs on upright chest x-ray with as little as 50 mL of intrapleural blood.
 - (C) The subclavian artery is the most common source of bleeding.
 - (D) A 7-French pigtail catheter is adequate for drainage of most hemothoraces.
 - (E) Pneumothorax almost never occurs concomitantly with hemothorax.
- 47 Which of the following occurs in most patients with myocarditis?
- (A) Chest pain
 - (B) Fever
 - (C) Antecedent viral syndrome
 - (D) S4 heart sound
 - (E) Leukocytosis
- 48 Which of the following effects does digitalis exhibit at therapeutic levels?
- (A) Decreases intracellular calcium
 - (B) Decreases intracellular sodium
 - (C) Increases intracellular potassium
 - (D) Increases heart rate
 - (E) T-wave inversion
- 49 Which of the following is true regarding gastroesophageal reflux disease (GERD) in infants?
- (A) Most infants fail to respond to conservative measures such as smaller, thickened feedings and frequent burpings.
 - (B) Vomiting is typically nonbilious and progressive, resulting in projectile emesis.
 - (C) Ranitidine and metoclopramide are the mainstays of medical therapy.
 - (D) Most infants with GERD ultimately suffer from failure to thrive.
 - (E) Infant GERD typically persists into adulthood.
- 50 Which cardiac chamber is most commonly injured in penetrating thoracic injury?
- (A) Right atrium
 - (B) Left atrium
 - (C) Right ventricle
 - (D) Left ventricle
 - (E) All chambers are injured equally as often.
- 51 Which of the following is a criterion for the systemic inflammatory response syndrome (SIRS)?
- (A) Systolic BP <90
 - (B) Diastolic BP <60
 - (C) HR <90
 - (D) Temperature <36°C
 - (E) RR <20
- 52 A mother brings her 3-year-old daughter to the ED for evaluation of a persistent, foul-smelling, bloody vaginal discharge. The patient has been complaining of "itching down there" and her mother noted that she has been frequently placing her hands in her perineal region. Which of the following is the most likely cause of her symptoms?
- (A) *Trichomonas* vaginitis
 - (B) Poor perineal hygiene
 - (C) Dysfunctional uterine bleeding (DUB)
 - (D) *Candidal* vaginitis
 - (E) Vaginal foreign body
- 53 A 32-year-old woman presents with recurrent episodes of headaches, palpitations, and profuse diaphoresis. Her primary care doctor diagnosed her with an anxiety disorder but various selective serotonin reuptake inhibitors have been ineffective. In the ED, her vital signs include a temperature of 99.0°F, a pulse of 90, and a blood pressure of 175/100. Which of the following is the best agent to treat her hypertension?
- (A) Metoprolol
 - (B) Hydrochlorothiazide

- (C) Phenoxybenzamine
(D) Nifedipine
(E) Enalapril
- 54 A concerned mother brings her 15-year-old daughter to the ED with a chief complaint of irregular vaginal bleeding. The patient experienced menarche at age 13 and has never had regular periods. Recently, the bleeding has been heavier and more irregular than normal. She reports no history of easy bruising and has no petechiae on examination. Her hemoglobin is 11 g per dL. Which of the following is the most likely cause of her symptoms?
- (A) Hyperthyroidism
(B) Anovulation
(C) Endometriosis
(D) Asymptomatic *Chlamydia* infection
(E) Prolonged luteal phase (Halban's disease)
- 55 Which of the following can be prevented by treating group A beta-hemolytic streptococcal throat infection (GAS pharyngitis) with antibiotics?
- (A) Erythema marginatum
(B) Endocarditis
(C) Migratory arthritis
(D) Glomerulonephritis
(E) A, B, and C only
- 56 Which of the following antibiotics is most likely to cause aplastic anemia?
- (A) Vancomycin
(B) Piperacillin-tazobactam
(C) Doxycycline
(D) Chloramphenicol
(E) Azithromycin
- 57 A 14-year-old boy comes to the ED for a diffuse rash. He was in his primary care doctor's office four days prior for a sore throat and fatigue and was told he had a viral throat infection. The patient's mother insisted that the patient be given an antibiotic, which he has been taking regularly since then. What antibiotic has this patient most likely been taking?
- (A) Penicillin V
(B) Doxycycline
(C) Ciprofloxacin
(D) Amoxicillin
(E) Clindamycin
- 58 Which of the following traumatic injuries is more common in elderly patients?
- (A) Subdural hematoma
(B) Odontoid fracture
(C) Flail chest
(D) Central cord syndrome
(E) All of the above
- 59 A 22-year-old primigravida presents to your community ED at 34 weeks' gestation with a chief complaint of headache and mild crampy abdominal pain. Her blood pressure is 160/100. Suspecting preeclampsia, you start a magnesium drip. While the patient is awaiting transfer 2 hours later, the nurse alerts you that she believes the patient is magnesium toxic. Which of the following is a sign of magnesium toxicity?
- (A) Atrial fibrillation
(B) Increased deep tendon reflexes
(C) Somnolence
(D) Hyperventilation
(E) Diarrhea
- 60 Which of the following findings is seen in most patients with meningococcemia?
- (A) Bilateral adrenal infarction
(B) Skin lesions
(C) Hypothermia
(D) Seizure
(E) Arthritis
- 61 Which of the following is most useful in differentiating a patient with acute cholangitis from a patient with acute cholecystitis?
- (A) Jaundice
(B) Fever
(C) Abdominal tenderness
(D) Leukocytosis
(E) Murphy's sign
- 62 A 45-year-old man presents after a high-speed motor vehicle crash. He was the unrestrained driver going at 70 mph and rear-ended a car stopped in front of him. He remembers that he struck his chest on the steering wheel and notes that his car lacks an airbag. He complains of severe chest pain. His primary survey is completely intact and his vital signs are normal. A chest x-ray is performed and is normal. Pelvic x-ray and focused assessment of sonography in trauma (FAST) scans are negative. Secondary survey reveals no additional injuries and the cervical spine is cleared clinically. Which of the following is the most important next step in management?
- (A) Diagnostic peritoneal lavage
(B) Pericardiocentesis
(C) CT aortogram
(D) Admit for observation
(E) Discharge home

- 63 A 55-year-old woman presents with wrist pain after falling on her outstretched right hand. A lateral wrist radiograph is shown in Figure 9-7. Which of the following is the most likely diagnosis?

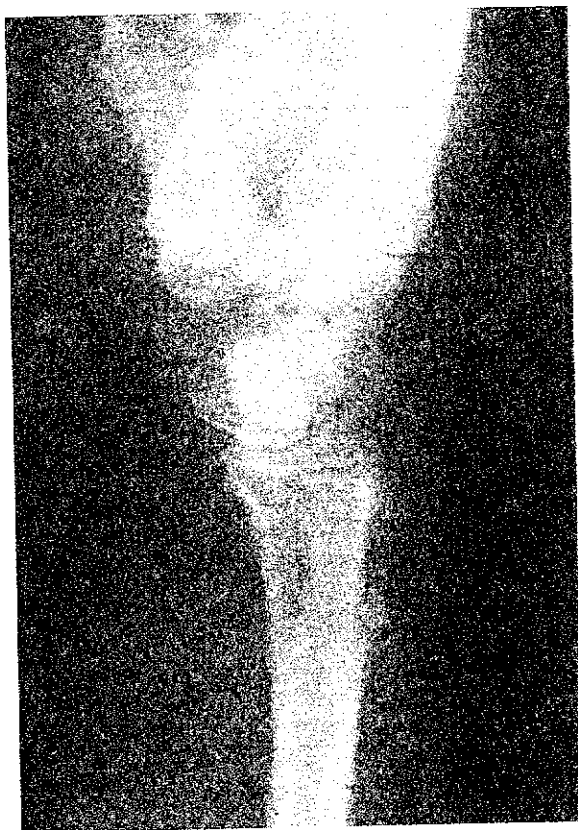


Figure 9-7.

- (A) Scaphoid fracture
 (B) Lunate dislocation
 (C) Perilunate dislocation
 (D) Distal radius fracture
 (E) Thumb metacarpal fracture
- 64 Direct synthesis of which of the following clotting factors is inhibited by coumadin?
- (A) Factor XII
 (B) Factor X
 (C) Factor VIII
 (D) Factor V
 (E) Factor III
- 65 Which of the following is true about myasthenia gravis (MG)?
- (A) Incidence peaks in the eighth decade of life.
 (B) Sensory deficits are most severe in the lower extremities.
 (C) The most frequent initial symptom is dysarthria.

- (D) Cooling decreases symptoms.
 (E) Muscle weakness tends to worsen after long periods of rest.

- 66 Which of the following is the most common area to be affected in compartment syndrome?
- (A) Arm
 (B) Forearm
 (C) Hand
 (D) Thigh
 (E) Leg
- 67 A 15-year-old boy presents with a severe sore throat and a scarlatiniform rash. A throat culture is taken but the patient is treated presumptively for group A β -hemolytic streptococcus (GAS) pharyngitis with oral penicillin V. Three days later, he returns without improvement, and you are surprised to find that his throat culture is negative. He has an exudative tonsillitis and no posterior lymphadenopathy or splenomegaly on examination with a diffuse, pruritic, scarlatiniform rash. What is the most likely organism responsible for his illness?
- (A) Resistant group A β -hemolytic *Streptococcus pyogenes*
 (B) Epstein-Barr virus (EBV)
 (C) *Arcanobacterium haemolyticum*
 (D) *Mycoplasma pneumoniae*
 (E) *Chlamydia pneumoniae*

- 68 A 23-year-old woman presents for right ear pain and drainage after being struck on the side of the head with a basketball. Her tympanic canal and membrane are shown in Fig. 9-8. Which of the following is the most appropriate next step in management?

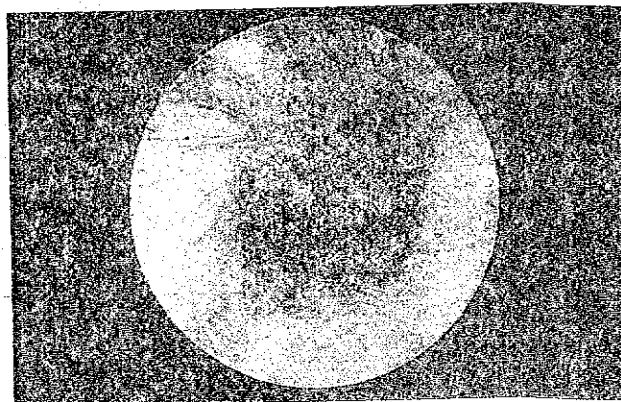


Figure 9-8.

- (A) Prednisone 40 mg PO q.d. \times 4 days
 (B) Doxycycline 100 mg PO b.i.d. \times 10 days
 (C) Gentamicin 100 mg IV t.i.d. \times 7 days

- (D) Copious ear irrigation with saline and peroxide
(E) No specific therapy
- 69 A 45-year-old man presents in a coma after being exposed to smoke from a building fire. The patient is immediately intubated. An arterial blood gas (ABG) demonstrates metabolic acidosis and an extremely elevated lactate level. Which of the following is the most important medication to administer?
- (A) Amyl nitrite
(B) Sodium nitrite
(C) Sodium thiosulfate
(D) Methylene blue
(E) Dexamethasone
- 70 Which of the following is true regarding drug-induced gingival disease?
- (A) Gingivitis can complicate drug-induced gingival hyperplasia.
(B) Almost all patients on phenytoin eventually develop gingival hyperplasia.
(C) Phenytoin-associated gingival hyperplasia is dose dependent.
(D) Good oral hygiene is unlikely to improve the condition.
(E) Phenytoin is the only drug that causes gingival hyperplasia.
- 71 Which of the following is true for patients with suspected globe rupture?
- (A) Succinylcholine is the paralytic of choice for rapid-sequence intubation.
(B) Tonometry is indicated to assess for concomitant glaucoma.
(C) Eye shielding should be avoided due to infectious complications.
(D) Intravenous antibiotics should be given.
(E) Tetanus immunization is contraindicated.
- 72 Which of the following is the most common opportunistic infectious agent in AIDS patients?
- (A) Tuberculosis
(B) *Pneumocystis carinii*
(C) *Cryptococcus neoformans*
(D) *Toxoplasma gondii*
(E) Cytomegalovirus (CMV)
- 73 Which of the following is indicated for treatment of acute angle closure glaucoma?
- (A) Topical cycloplegics
(B) Topical antivirals
(C) Aspirin
(D) Acetazolamide
(E) Lateral canthotomy
- 74 Which of the following is true regarding hemoptysis?
- (A) Massive hemoptysis is defined as expectorated blood > 1 L per 24-hour period
(B) Chest x-rays help to localize the site of bleeding in 90% of patients with hemoptysis.
(C) The most common source of bleeding in massive hemoptysis are the bronchial arteries.
(D) If the site of bleeding is limited to one lung, the patient should be placed in a lateral decubitus position with the affected side up to promote drainage.
(E) The most effective nonsurgical approach to massive hemoptysis is laser photocoagulation.
- 75 An institutionalized patient with psychiatric disease presents with abdominal pain, distension, and nausea without vomiting. The image shown in Fig. 9-9 suggests which of the following diagnoses?



Figure 9-9.

- (A) Sigmoid volvulus
(B) Small bowel obstruction
(C) Intussusception
(D) Diabetic gastroparesis
(E) Hirschsprung's disease

- 76 A 3-week-old term neonate is brought by his parents with fever of 102.0°F. He appears active and nontoxic, his right tympanic membrane (TM) is slightly red, but the rest of the physical examination is completely

- unremarkable. Which of the following is the most appropriate next step in management?
- (A) Discharge home with routine follow-up.
 - (B) Discharge home with next-day follow-up.
 - (C) Discharge home with next-day follow-up and amoxicillin.
 - (D) Admit for observation with prophylactic antibiotics.
 - (E) Admit for observation with prophylactic antibiotics and blood, urine, and cerebrospinal fluid (CSF) cultures.
- 77** Intussusception in adults:
- (A) Most often presents with symptoms of partial intestinal obstruction.
 - (B) Most commonly occurs in the large intestine.
 - (C) Is most commonly idiopathic, without an identifiable lead point.
 - (D) Is the second most common cause of large bowel obstruction.
 - (E) Is best diagnosed with barium or water contrast enema.
- 78** A 42-year-old man with hypertension presents with significant swelling of his lips and tongue. He has been taking lisinopril for the past 8 months. Which of the following is true?
- (A) This adverse drug event is most common in the first week after therapy.
 - (B) This patient's symptoms may be resistant to treatment with epinephrine.
 - (C) These patients typically do not have urticaria.
 - (D) Angiotensin-receptor blockers are unsafe to use in this patient.
 - (E) All of the above.
- 79** A 64-year-old woman with past history of sick sinus syndrome and recent pacemaker placement presents with neck pain after a low-speed motor vehicle collision. She has midline cervical spine tenderness at C6-7. A cervical spine plain film series is inadequate for visualizing these segments, so a CT scan is performed. The CT scan is normal, but the patient still has pain in her neck. Which of the following is the most appropriate next step in management?
- (A) Discharge home with soft collar
 - (B) Discharge home with hard collar
 - (C) Flexion-extension cervical spine x-rays
 - (D) Oblique cervical spine x-rays
 - (E) MRI of the cervical spine
- 80** A 34-year-old man presents with chest pain and shortness of breath after being struck in the right side of the chest with a baseball bat. Chest x-ray demonstrates a 30% pneumothorax on the right. Which of the following is the most appropriate management at this time?
- (A) Needle thoracostomy at the second intercostal space, midclavicular line
 - (B) Needle thoracostomy at the fifth intercostal space, midclavicular line
 - (C) Tube thoracostomy at the second intercostal space, midaxillary line
 - (D) Tube thoracostomy at the fifth intercostal space, midaxillary line
 - (E) Observation alone
- 81** A 12-month-old girl presents with pain on urination. Which of the following is the most appropriate urine collection method for this patient?
- (A) Diaper collection
 - (B) Bag collection
 - (C) Urethral catheterization
 - (D) Midstream clean catch
 - (E) Suprapubic catheterization
- 82** A 26-year-old woman presents with dyspnea and pleuritic chest pain and is subsequently diagnosed with a pulmonary embolism (PE). She is not pregnant, takes no oral contraceptive therapy, and is a nonsmoker, but she notes that her mother has had two PEs. Which of the following is the most likely cause of this patient's PE?
- (A) Plasminogen deficiency
 - (B) Nephrotic syndrome
 - (C) Cervical cancer
 - (D) Factor V Leiden
 - (E) Protein S deficiency
- 83** In patients with tibial shaft fractures, which of the following is the most common associated finding?
- (A) Fibular fracture
 - (B) Common peroneal nerve injury
 - (C) Posterior tibial nerve injury
 - (D) Dorsalis pedis artery injury
 - (E) Posterior tibial artery injury
- 84** Fracture of which of the following structures is readily identified by oblique views of the cervical spine?
- (A) Spinous process
 - (B) Lamina
 - (C) Pedicle
 - (D) Vertebral body
 - (E) Dens
- 85** A 34-year-old woman presents to the ED with increasing low abdominal pain. She was seen by a colleague a week ago and diagnosed with an ectopic

- pregnancy in her left fallopian tube. Her OB was consulted at that time and the patient was started on methotrexate therapy. What is the *most likely* cause of her abdominal pain?
- (A) Treatment failure and increasing size of the ectopic pregnancy
 - (B) Tubal rupture
 - (C) Appendicitis
 - (D) Normal "separation pain" from methotrexate use
 - (E) PID
- 86** A 50-year-old woman presents with sudden onset of crushing chest pain at rest. She has no prior history of chest pain. Her EKG demonstrates 5 mm of ST-segment elevation in all anterior leads. An immediate angiogram is performed, which reveals coronary arteries completely clear of occlusion. The diagnosis of coronary vasospasm is made. Which of the following represents the proportion of acute MI due to coronary vasospasm alone?
- (A) 1%
 - (B) 10%
 - (C) 25%
 - (D) 33%
 - (E) 50%
- 87** A 22-year-old man states that he ingested 20 to 30 condoms containing a total of 1 kg of cocaine 12 hours ago. He subsequently became concerned about rupture of the condoms and now wants to get them out of his body. He is completely asymptomatic. His vital signs are normal and his physical examination is unremarkable. Which of the following is the most appropriate next step in management?
- (A) Polyethylene glycol
 - (B) Activated charcoal
 - (C) Hemodialysis
 - (D) Endoscopic removal
 - (E) Operative removal
- 88** A 65-year-old woman with hypertension, atrial fibrillation, and type II diabetes presents with acute vision loss in her right eye with no eye pain. On examination, visual acuity is markedly decreased and the patient has a striking afferent pupillary defect. She also has a right-sided carotid bruit. Which of the following is the most appropriate next step in management?
- (A) Lateral canthotomy
 - (B) Globe massage
 - (C) Aspirin
 - (D) Heparin
 - (E) TPA
- 89** Which of the following is the most appropriate outpatient management for mechanical corneal abrasions?
- (A) Eye patching
 - (B) Topical anesthetic
 - (C) Topical steroids
 - (D) Topical antibiotics
 - (E) Topical saline solution
- 90** In healthy adults, which of the following is a normal CSF opening pressure?
- (A) 0 cm water
 - (B) 5 cm water
 - (C) 15 cm water
 - (D) 30 cm water
 - (E) 60 cm water
- 91** A 28-year-old woman at 29 weeks' gestation is brought to the ED by ambulance after a minor motor vehicle accident. She was the restrained driver of a car traveling approximately 20 mph when she lost control on "black ice" and collided with a road sign. There was minimal damage to the car according to emergency medical services (EMS) but they placed her in a cervical spine collar and on a backboard for transport. She has no complaints in the ED except for discomfort related to the board and collar. After finding that her primary and secondary survey is intact, she is asking to go home. Which of the following is the next best step in management?
- (A) Discharge the patient with close obstetric follow-up.
 - (B) Document fetal heart tones before discharge.
 - (C) Perform a transabdominal ultrasonography to ensure fetal viability and absence of placental abruption.
 - (D) Perform 4 hours of cardiotocographic monitoring before discharge.
 - (E) Admit her for 23 hours of cardiotocographic monitoring in labor and delivery.
- 92** Which of the following is the most common cause of upper gastrointestinal bleeding (UGIB)?
- (A) Esophageal varices
 - (B) Mallory-Weiss tear
 - (C) peptic ulcer disease (PUD)
 - (D) Esophagitis
 - (E) Gastritis
- 93** A 44-year-old man with a history of kidney stones presents with progressively worsening left flank pain for several days, dysuria, nausea, vomiting, and fever to 101°F. Urinalysis demonstrates 50 WBC per hpf, positive leukocyte esterase, and positive bacteria. A

CT scan of the abdomen and pelvis demonstrates a 7-mm stone at the left ureteropelvic junction. Which of the following is the most appropriate next step in management?

- (A) Discharge home with oral hydrocodone
- (B) Discharge home with oral hydrocodone and promethazine
- (C) Discharge home with oral hydrocodone, promethazine, and ciprofloxacin
- (D) MRI of the abdomen and pelvis
- (E) Emergent urologic consultation

94 A 17-year-old girl presents with bilateral lower quadrant abdominal pain and vaginal discharge for 3 days. She reports having been sexually active with multiple partners in the last month. Her last menstrual period just finished 3 days ago. She denies fever, vomiting, dysuria, and diarrhea. Her urine pregnancy test is negative. Which of the following is most likely to yield the correct diagnosis?

- (A) Physical examination
- (B) CBC
- (C) Urinalysis
- (D) Liver function tests
- (E) CT scan of the abdomen/pelvis

95 In most patients diagnosed with community-acquired pneumonia, which of the following contributes most to a patient's Pneumonia Severity Index (PSI) score?

- (A) Underlying neoplastic disease
- (B) Cirrhosis
- (C) Age
- (D) Sex
- (E) Pulse > 125

96 A 65-year-old man needs an emergent CT scan with IV contrast. Which of the following is a risk factor for development of contrast-induced acute tubular necrosis?

- (A) Hypertension
- (B) Pheochromocytoma
- (C) Urinary tract infection
- (D) Diabetes
- (E) Immune-compromised state

97 A 23-year-old woman presents after twisting her right knee while playing tennis. She developed swelling in her knee immediately after the injury but was able to ambulate. Physical examination demonstrates a moderate effusion without definite ligamentous instability in any direction. Which of the following should you tell this patient?

- (A) "You will require surgery."

- (B) "You have a ligament tear."
- (C) "You have a knee dislocation."
- (D) "Your knee will heal just fine."
- (E) "I can't make a definite diagnosis at this time."

98 A 50-year-old man presents with right lower facial swelling for 3 days. He has had right lower molar pain for several weeks but has not seen a dentist. The patient has a history of alcohol abuse. On examination, the patient has a low-grade fever, restricted neck movement, trismus, and firm swelling in the bilateral submandibular and submental regions. Which of the following is true regarding this patient?

- (A) The most commonly affected teeth with this condition are the lateral incisors.
- (B) *Pseudomonas* species are the most common cause.
- (C) The most common cause of death is septic shock.
- (D) Fiberoptic nasotracheal intubation is the preferred method of airway control.
- (E) Corticosteroids are clearly associated with better outcomes.

99 A 10-year-old boy presents with fever, diarrhea, pallor, and weakness. Renal function is abnormal and the patient is anemic. A peripheral blood smear is shown in Figure 9-10. Which of the following is the most likely diagnosis?

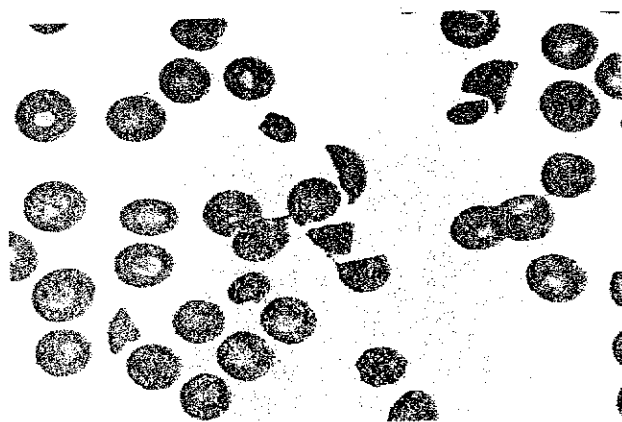


Figure 9-10.

- (A) Henoch-Schönlein purpura
- (B) Hemolytic uremic syndrome (HUS)
- (C) Disseminated intravascular coagulation (DIC)
- (D) Idiopathic thrombocytopenic purpura
- (E) Nephrotic syndrome

100 A 4-year-old boy presents with penile pain. His physical examination is shown in Figure 9-11. Which of the following is the correct diagnosis?

- (A) Phimosis
- (B) Paraphimosis
- (C) Balanitis
- (D) Testicular torsion
- (E) Scrotal hernia

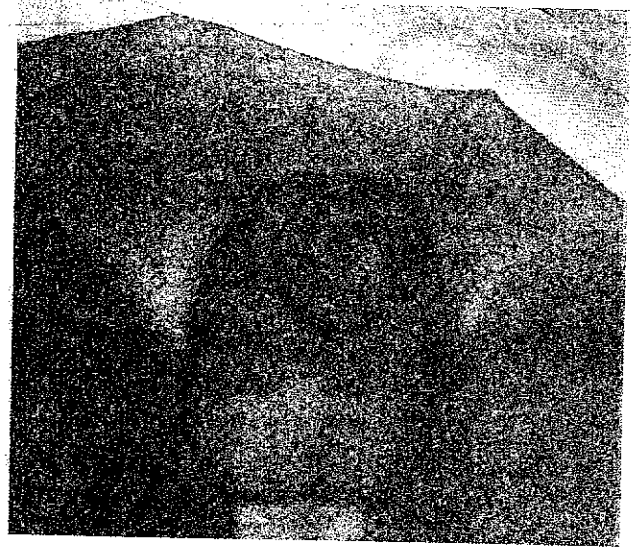


Figure 9-11.

Answers and Explanations

1 Answer B. Other than the epiglottitis, epiglottitis may involve several supraglottic structures, including the vallecula, aryepiglottic folds, arytenoids, lingual tonsils, and base of the tongue. Inflammation does not extend to the infraglottic tissues because of the robust attachments between the infraglottic mucosa and submucosa. Owing to the variable involvement of several supraglottic structures, epiglottitis is sometimes referred to as *supraglottitis*. Drooling and stridor are unusual presenting signs in patients with epiglottitis. Historically, however, it has been thought that patients presenting with these symptoms, especially if they have developed over a short time period, are at higher risk for subsequent airway loss. No large, prospective trials have been conducted to sort this out. Most typically, patients with epiglottitis present with a severe sore throat and painful dysphagia. Adult epiglottitis does not demonstrate any seasonal variation, but appears more common in males and smokers. Neither epinephrine nor corticosteroids has been shown to be beneficial, despite their widespread use. Caution is advised regarding the use of epinephrine as a temporizing measure in patients with epiglottitis due to possible rebound upper-airway constriction after the treatment is completed. Ninety percent of patients with epiglottitis will have abnormal lateral neck films. The classic finding is the "thumb" or "thumbprint" sign, indicating the presence of a swollen, inflamed epiglottis. However, a normal film cannot exclude the disease. Direct nasopharyngoscopy has been the gold standard of diagnosis, as it allows direct visualization of the tissue in question. Recently, however, the "vallecula" sign has been suggested as another method of screening for the presence of epiglottitis on lateral neck films. This method relies on the physician's ability to locate the base of the tongue and trace it inferiorly toward the hyoid bone to locate the vallecula. If the vallecula is not deep and roughly parallel to the pharyngo-tracheal air column, then epiglottitis is present. In a small trial, this sign was shown to be 98% sensitive and 100% specific for epiglottitis.

2 Answer D. The patient was bitten by a coral snake, which is identifiable in North America by the presence of red bands that are bounded by yellow bands ("red on yellow kill a fellow"). All patients suffering coral snake envenomation should be treated with antivenin even in the absence of clinical symptoms. Coral snake venom is neurotoxic and signs of neurotoxicity may develop rapidly or be

delayed for up to 12 hours. In addition, patients may experience nausea, vomiting, headache and sweating. Ptosis is frequently the initial sign of neurotoxicity and may be followed by delirium, tremors, drowsiness, hypersalivation, and multiple cranial nerve abnormalities (dysarthria, diplopia, dysphagia). In severe envenomations, respiratory muscle paralysis occurs leading to respiratory failure and death. If a pit viper bite was suspected, then observation would be the best course of action. If no signs of envenomation develops 4 to 6 hours after pit viper envenomation, the patient may safely be discharged with routine follow-up instructions. (Figure © Dr. Julian White.)

3 Answer B. The incidence of seizures after ischemic stroke is uncertain but is cited to be as high as 13%. Typically, patients with seizures after stroke are divided into patients who have seizures within 7 days (early seizures) and those who develop seizures after 7 days (late seizures). Prophylactic use of anticonvulsants in patients with ischemic stroke has not been shown to reduce either early or late seizures although there is limited data on this topic. Therefore, the prophylactic use of anticonvulsants in such patients is not recommended. When seizures do occur, their management is the same as "conventional" seizure management, and status epilepticus is rare. Current guidelines recommend that patients with an ischemic stroke in the ED who develop seizures warrant standard treatment (if necessary) to terminate the seizure followed by treatment with an anticonvulsant to prevent recurrence. There are no special contraindications to antiepileptic use in stroke patients.

4 Answer C. The half-life of carboxyhemoglobin is 6 hours on room air, 90 minutes on 100% nonre-breather, and 30 minutes on hyperbaric oxygen.

5 Answer C. Retrobulbar hemorrhage is a result of ocular trauma that causes pressure on the posterior portion of the eye. The globe is pushed outward, and proptosis may be seen on physical examination. Increased pressure in the orbit can compress the central retinal artery or vein and cause loss of vision. Choices A, B, D, and E are all pathologic processes involving the anterior portion of the eye and are not usually caused by a retrobulbar hematoma. Secondary glaucoma may occur as a result of increased overall pressure in the globe, including in the

anterior chamber. Treatment of a retrobulbar hemorrhage involves emergent lateral canthotomy and drainage of the hematoma out of the temporal border of the globe. Failure to perform lateral canthotomy for acute retrobulbar hemorrhage may result in irreversible vision loss in as little as 90 minutes.

6 Answer A. This is the swan neck deformity. It is caused by hyperextension at the proximal interphalangeal (PIP) joint and flexion at the distal interphalangeal (DIP) joint. The DIP joint flexion occurs due to elongation or rupture of the extensor tendon attachment to the distal phalanx (i.e., similar to a mallet injury). Left untreated, PIP hyperextension occurs as a consequence of the distal mallet deformity. However, the deformity can begin in the PIP joint as well due to synovitis of the volar capsule resulting in PIP hyperextension. In the latter case, DIP flexion occurs as a secondary effect. Both the swan neck and boutonniere deformities are common in rheumatoid arthritis. (Figure reprinted with permission from Oatis CA. *Kinesiology: The mechanics and pathomechanics of human movement*. Lippincott Williams & Wilkins; 2004.)

7 Answer E. Sitz is a word that comes from the German word, *sitzen*, meaning "to sit." A *sitz bath* refers to any device that allows a patient to immerse only the perineum and buttocks in water while draping the rest of their body outside the tub. While patients may add various medications to the water, it is not recommended and there is no evidence that such additives help. Sitz baths are thought to help a variety of perianal complaints, such as hemorrhoids, because anal canal pressure decreases significantly in warm water (40°C) and blood flow improves.

8 Answer C. The patient has a large left-sided varicocele. Varicoceles are caused by abnormal dilation of the testicular vein and pampiniform plexus of the scrotum due to venous pooling from impaired drainage of the left internal spermatic vein into the left renal vein. Large varicoceles substantially increase the risk of infertility due to impaired blood flow and temperature of the ipsilateral testis. Testicular torsion may occur in patients with varicoceles but is not as common as infertility. Epididymitis and malignancy do not occur at appreciably higher rates in patients with varicoceles. Deep venous thrombosis due to inferior vena cava thromboses may cause varicoceles, but this is rare. (Figure from Fleisher GR, Ludwig S, Henretig FM, et al. eds. *Textbook of pediatric emergency medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2000, with permission.)

9 Answer B. Any patient with a history of recent unprotected anal intercourse who presents with symptoms of proctitis should be treated empirically for *N. gonorrhoeae* proctitis. Because concurrent infection with *Chlamydia trachomatis* is common in patients infected with gonorrhea, empiric therapy should cover this organism as well. Podophyllin is a treatment for human papillomavirus (condyloma acuminatum). Valacyclovir is a treatment for herpes proctitis, penicillin is a treatment for syphilis, and lopinavir is a protease inhibitor used to treat human immunodeficiency virus (HIV). Owing to this patient's high-risk lifestyle, he should undergo testing for HIV and for syphilis but empiric treatment is not necessary.

10 Answer E. Twenty-five percent of patients with Crohn's disease will have extraintestinal manifestations. Approximately 20% will have arthralgias of various types that usually occur in concert with disease activity. Episcleritis and anterior uveitis (or iritis) are the most common ocular complications. Episcleritis does not affect visual acuity but anterior uveitis can ultimately lead to a decrease in vision if the posterior segment becomes involved. Cholelithiasis and nephrolithiasis are common complications of Crohn's disease due to disease of the terminal ileum, which interrupts bile acid resorption and results in oxalate malabsorption. Pyoderma gangrenosum and erythema nodosum are the most common cutaneous manifestations of Crohn's disease although rashes commonly occur due to hypersensitivity reactions to frequently used drugs as well.

11 Answer D. Ranson's criteria are best used to exclude severe disease as its sensitivity for predicting severity ranges from 57% to 85%. However, the presence of ≥ 3 Ranson's criteria is a marker of more severe disease as patients with 3, 4, or 5 criteria have a 10% mortality rate (vs. <5% for patients with <3 criteria, and >60% for patients with ≥ 6 criteria). The use of Ranson's criteria is problematic, however, because 5 of the criteria are assigned upon admission, but the remaining 6 criteria are not assigned until 48 hours after admission. The five Ranson's criteria are glucose >200 mg per dL, age older than 55, LDH >350 IU per L, AST >250 SF units, and WBC count >16,000 per mm³ (mnemonic: "Georgia law" or GA LAW).

12 Answer C. Peptic ulcer disease (PUD) is the most common cause of UGIB, accounting for half of all cases. Bleeding is the most common complication of PUD, and perforation is the next most common.

Gastric outlet obstruction occurs in only 2% of patients with known PUD.

- 13 Answer A. The treatment for aspirin overdose involves gastrointestinal decontamination, hydration, and enhanced excretion of drug. Urinary alkalization with intravenous bicarbonate increases the amount of ionized salicylate, which is excreted more easily by the kidneys than unionized salicylic acid. A urine pH goal of 7.5 to 8 optimizes this approach. Forced diuresis has been found to increase the risk of cerebral and pulmonary edema and does not result in increased excretion of salicylic acid. Activated charcoal and whole bowel irrigation are recommended in cases of acute intoxications and intoxications with enteric-coated aspirin, respectively. Hemodialysis may be life saving for patients who have severe salicylate toxicity, organ failure, or failure of standard, noninvasive management.
- 14 Answer E. In trauma patients, anterior cord syndrome most commonly occurs in hyperflexion injuries in which herniated vertebral discs or vertebral body fragments compress the anterior aspect of the spinal cord or the anterior spinal artery. The anterior spinal artery provides blood supply to the anterior two thirds of the spinal cord. The primary structures affected in the spinal cord are the spinothalamic tract, which is responsible for the transmission of pain and temperature sensory input, and the corticospinal tract, which carries descending voluntary motor signals. The dorsal or posterior columns, which are responsible for proprioception and vibration sensation, are unaffected so those functions are preserved.
- 15 Answer D. Elderly patients, diabetic patients, and women with acute MIs may have atypical symptoms without the classic history of left-sided chest pain. Dyspnea, nausea, and diaphoresis may be anginal equivalents in many patients. Additionally, patients may deny "pain"—rather, they may describe their symptoms as "pressure" or "discomfort."
- 16 Answer D. The EKG demonstrates no specific findings consistent with acute myocardial ischemia or infarction. Cocaine-induced myocardial ischemia is due to both vasospasm and hyper-aggregatory platelets, which may cause acute thrombosis. Aspirin is indicated in patients with cocaine-induced chest pain until it is known for certain that MI or ischemia is not present. In a patient without current symptoms of chest pain, nitroglycerin and morphine are not indicated. Metoprolol is relatively contraindicated in cocaine-induced chest pain as there is a theoretic risk of reducing cardiac output in the face of increased peripheral vascular resistance. Tissue plasminogen activator (tPA) is not emergently indicated in a patient with chest pain without ST-elevation myocardial infarction (STEMI).
- 17 Answer E. There is a dearth of data regarding pediatric patients with ventriculoperitoneal shunt (VPS) infections. However, several studies have suggested that as many as one third of patients may present with nonspecific clinical findings. The risk of infection is highest in the first 6 months after insertion or instrumentation (in the case of revision). In addition, patients younger than 4 years old and older than 61 years old have been shown to be at increased risk of infection. Lumbar puncture should never be performed without first obtaining a CT scan and reviewing the findings with a neurosurgeon. The mortality of VPS infection is roughly 30% to 40%. As many as one third of patients with VPS infection may present with signs and symptoms of obstruction or VPS failure with or without a fever. These include hydrocephalus, papilledema, hypertension with concomitant bradycardia, and irregular respirations (Cushing response), personality changes, ataxia, and cranial nerve palsies. Over 80% of patients with a VPS infection have peripheral leukocytosis.
- 18 Answer B. Limited range of motion in the shoulder in patients with preceding trauma is most likely to be due to adhesive capsulitis (also called frozen shoulder). Adhesive capsulitis is characterized by stiffness with or without pain in all directions of shoulder movement. Prevention and treatment of adhesive capsulitis after shoulder injury are accomplished by range of motion exercises. Rotator cuff tear is usually heralded by significant pain when the arm is moved in a particular direction. Septic arthritis usually involves a febrile patient with extreme pain on any movement of the joint. Scapular fracture is rare in patients without high-force mechanisms such as motor vehicle crashes or falls from height. Rheumatoid arthritis would be unlikely in an 85-year-old without prior history.
- 19 Answer A. Edrophonium is a cholinesterase inhibitor and may therefore produce symptoms of cholinergic toxicity, including bradycardia, excessive airway and oral secretions, tearing, and dyspepsia associated with nausea or vomiting. Of these, bradycardia is the most common serious side effect, even though it occurs very infrequently, having been reported in only 0.16% of patients. However, as excessive airway secretions may also occur, caution is advised in patients with lung diseases such as asthma or chronic obstructive pulmonary disease.

(COPD). Atropine should be at the bedside in case either of these symptoms occurs. Oculogyric crisis describes a dystonic reaction in which patients experience severe torticollis and extreme upward gaze that may persist for hours. It is most commonly due to treatment with neuroleptics (antipsychotics) and is terminated with the antimuscarinic drug benztropine (Cogentin) in concert with benzodiazepines. Cough, atrial fibrillation, and seizures are not associated with edrophonium use.

20 Answer B. *Carpal tunnel syndrome* refers to median neuropathy due to compression at the wrist. Common conditions associated with carpal tunnel syndrome include diabetes, hypothyroidism, pregnancy, and rheumatoid arthritis. Findings include pain and paresthesias in the thumb, index, and long fingers. Phalen's test (pain from holding the wrists flexed for 60 seconds) is more sensitive than Tinel's test (pain from tapping the volar wrist), but neither is reliable enough to exclude or prove the diagnosis and nerve conduction studies are the gold standard. Treatment involves wrist splinting, with surgery reserved for refractory cases.

21 Answer D. Kidney stones most commonly occur in middle-aged patients, usually men. Recurrence occurs in approximately half the number of patients. Risk factors include age, male gender, family history, and conditions which increase serum and urinary calcium levels. Kidney stones are divided into four main categories—calcium, magnesium-ammonium-phosphate, uric acid, and cystine. Calcium stones represent approximately two third of all stones and occur more often in patients with common precipitants of hypercalcemia, including hyperparathyroidism, milk-alkali syndrome, laxative abuse, and sarcoidosis. Inflammatory bowel disease (IBD) also causes the formation of calcium oxalate stones, due to hyperoxaluria. Magnesium-ammonium-phosphate (struvite) stones account for one fifth of all calculi and occur in patients with urinary tract infections due to *Proteus*, *Klebsiella*, and *Pseudomonas*. Uric acid stones occur in patients with hyperuricemia, often due to gout. They are usually radiolucent and missed on plain radiographs. Cystine stones are the least common and are due to hypercystinuria, an inborn error of metabolism usually diagnosed at birth.

22 Answer C. Post-MI pericarditis generally occurs within four days of MI and is characterized by a change in the quality of chest pain. It is treated with NSAIDs, in the same manner as idiopathic pericarditis. Less than a quarter of all patients with MI

develop pericarditis. EKG changes are usually absent, masked by the MI findings. Pericardial friction rub is characteristic and often audible. The proposed etiology is autoimmune. Dressler's syndrome is the term given to pericarditis which occurs 2 to 3 weeks after MI. It is clinically and electrocardiographically indistinguishable from ordinary pericarditis and should be treated in the same way.

23 Answer A. Breast milk jaundice develops in 2% of breast-fed infants *after* the seventh day of life. Levels peak during the second to third week of life and may be as high as 10 to 30 mg per dL. Treatment is straightforward and involves stopping breast-feeding for 1 to 2 days and substitution of bottle feeding with formula. This results in a rapid decline in serum bilirubin after which nursing can be resumed without a recurrence of the prior hyperbilirubinemia. Breast milk jaundice is an unconjugated hyperbilirubinemia. Hyperbilirubinemia is described as "conjugated" when direct bilirubin exceeds 2 mg per dL or represents >20% of the total bilirubin level. Although breast milk jaundice is generally a benign process, phototherapy may be required if total bilirubin levels exceed 18 to 20 mg per dL. Finally, breast milk jaundice should be differentiated from breast-feeding jaundice, which is an early-onset unconjugated hyperbilirubinemia that occurs in the first week in breast-fed infants. The mechanism, as with breast milk jaundice, is unclear, but is thought to be related to decreased milk intake with dehydration or reduced caloric intake.

24 Answer B. Posterior parapharyngeal space infections are more dangerous than anterior infections as they may encroach on the cervical sympathetic chain as well as the carotid artery and jugular vein. Patients with such infections may develop an ipsilateral Horner's syndrome or cranial neuropathies of cranial nerves IX, X, XI, and XII. Jugular vein thrombosis may also occur along with erosion of the carotid artery, resulting in life threatening hemorrhage or aneurysm formation. Involvement of the jugular vein may result in septic thrombophlebitis and a subsequent Lemierre's syndrome, which is also known as postanginal septicemia. Patients with this problem present with symptoms of severe sepsis after their symptoms of pharyngitis have resolved. All deep space neck infections have the capability of causing such severe complications by virtue of their ability to extend to adjacent spaces resulting in a posterior parapharyngeal space infection. However, as the posterior pharyngeal space lies alongside the carotid sheath, infections in this area most commonly erode into the adjacent vasculature.

- [25] Answer E. "Crossed signs," in which a patient has unilateral cranial nerve deficits but contralateral hemiparesis and hemisensory loss are diagnostic of brainstem infarction. The vertebral arteries, which have their origin from the subclavian arteries, merge to form the basilar artery at the pontomedullary junction. At the junction of the pons and the midbrain, the basilar artery again separates into the two posterior cerebral arteries. The brainstem, from the medulla to the midbrain, is therefore supplied by branches of the vertebrobasilar arterial system. The facial nucleus, which originates within the pons, may be infarcted when branches of the basilar artery are occluded. As the infarction involves the facial nucleus, the entire face, including the forehead, is affected. As the descending corticospinal tract has not yet reached the medullary decussation, occlusion on one side of the pons affects the descending motor fibers reaching the contralateral body and results in contralateral hemiparesis. When this syndrome includes an ipsilateral rectus palsy, it is known as *Millard-Gubler syndrome* due to infarction of both the facial and abducens nuclei which are in very close proximity in the pons. Infarction of the basilar artery proper is typically a catastrophic event, resulting in quadriplegia and often respiratory failure and death.
- [26] Answer B. The chief use of EKG in the evaluation of patients with a suspected pulmonary embolism (PE) is to rule out the presence of other causes of chest pain such as myocardial ischemia or acute MI and pericarditis. Numerous EKG findings have been reported in the setting of acute PE, although " $S_1Q_3T_3$ " is perhaps the most famous. Several papers have reliably refuted the utility of this finding. $S_1Q_3T_3$ was first described in a 1935 study of seven patients who all likely had massive pulmonary embolus. Similar studies have all been plagued by a selection bias for patients with large or massive PE. Several EKG findings are more specific in patients with massive PE, but other clinical signs and symptoms (e.g., hypoxia, dyspnea, tachypnea and chest pain) are typically more useful than EKG.
- [27] Answer C. There is no evidence that intravenous corticosteroids provide additional benefits over oral corticosteroids. However, because patients presenting to the ED with acute asthma exacerbations may often be in extremis, many physicians prefer to deliver steroids intravenously. Regardless, it takes from 6 to 24 hours for corticosteroids to exert an effect on pulmonary mechanics. Unless patients are taking chronic oral corticosteroids, there is no need to taper outpatient therapy for acute asthma exacerbations. Inhaled corticosteroids are the cornerstone of effective long-term asthma management. Although corticosteroids are vital in the long-term management of asthma, chronic exposure to systemic corticosteroids is fraught with potential complications. Even short-term use may result in transient insulin-resistance, peptic ulcer disease (PUD), aseptic necrosis of the femur, edema, and weight gain as well as mood disturbances. Long-term use may result in muscle weakness or wasting, immunosuppression, Cushing's syndrome, cataracts, diabetes, hypertension, growth retardation in children, and adrenal axis suppression.
- [28] Answer A. Patients younger than 12 months of age with febrile seizure are at higher risk for having meningitis as the cause of their febrile seizure. The American Academy of Pediatrics (AAP) recommends that patients younger than 12 months of age should all receive a lumbar puncture and that patients younger than 18 months of age should be strongly considered for lumbar puncture. Other higher risk groups include patients with focal or prolonged seizures, abnormal physical examinations, or toxic appearance. Most ordinary febrile seizures are treated symptomatically with antipyretics. Approximately one third of patients with febrile seizures will have at least one more febrile seizure episode. Risk factors for this include young age at first seizure, lower temperature with the seizure episode, a first-degree relative with febrile seizure, and short duration between fever onset and seizure event. Patients with febrile seizures are twice as likely to develop generalized epilepsy than the average population.
- [29] Answer E. The initial intravenous resuscitation fluid of choice in pediatric patients is 0.9 normal saline. It is given in a 20 mL per kg bolus and may need to be repeated twice in patients with severe dehydration. When sufficient bolus hydration has been given, maintenance fluids according to the "4/2/1 rule" are instituted: 4 mL/kg/hour for the first 10 kg of body weight, 2 mL/kg/hour for the next 10 kg, and 1 mL/kg/hour for every 10 kg after that. The maintenance fluid composition varies by age and may be looked up in a reference.
- [30] Answer B. Due to the need for powerful immunosuppressant agents, all solid-organ transplant recipients are at increased risk for infection. Infections are divided into three time periods—those occurring within the first month of transplantation, those occurring between 1 and 6 months after transplantation and those occurring >6 months after transplantation. Nosocomial agents are prominent in the first month, although CMV is the most prevalent

infection between 1 and 6 months (particularly CMV pneumonitis).

31 Answer A. *Cryptosporidium* is the most common cause of chronic diarrhea in patients with AIDS. However, it is much less common in the era of successful antiretroviral therapy. Cryptosporidiosis is usually self-limited in immunocompetent patients as well as in patients with AIDS when the CD4 count is >180 per μL . In contrast, patients with CD4 counts <100 may develop a chronic course of diarrhea and weight loss. Patients with CD4 counts <50 may experience fulminant diarrhea.

32 Answer C. Central retinal vein occlusion (CRVO) causes backup of blood flow into the eye and carries the potential for increased intraocular pressure, eventually leading to glaucoma. The classic history is acute or subacute painless loss of vision, although pain may occur in some cases. Risk factors include hypertension, diabetes, thrombophilia, Funduscopy examination reveals disc edema with tortuous veins and retinal hemorrhages. ED management is supportive in conjunction with ophthalmologist consultation. Choices A, B, D, and E may be caused by trauma or anterior eye disorders.

33 Answer C. Teeth are numbered starting with the upper right posterior-most molar, extending to the left side and then back down the lower left posterior-most molar, then to the right. There are three molars, two premolars, one canine, one lateral incisor, and one central incisor on each quarter jaw.

34 Answer A. Perimortem cesarean section should be performed in all pregnant patients suffering traumatic cardiac arrest with a fetus >24 weeks' gestational age. Maternal resuscitation always takes precedence over the fetus, but once cardiac arrest has occurred, an immediate decision to undergo perimortem cesarean section must be made. Seventy percent of fetuses will survive if delivered within 5 minutes of maternal arrest. None will survive after 25 minutes. Consent is unnecessary and should not be sought before the procedure. If the fetal gestational age is unknown, cesarean delivery should be performed if the fundal height exceeds the umbilicus. To perform the procedure, a large midline vertical incision ("classic" midline incision) is made from the subxiphoid process to the symphysis pubis. If an anterior placenta is encountered upon entering the uterus, it should be incised to reach the fetus, as bleeding can be addressed after the procedure. Ideally, verification of fetal viability through fetal heart tones would be documented before the procedure, but absence of

this information is not a contraindication and no time should be wasted attempting to document fetal viability.

35 Answer A. The patient has avascular necrosis of the femoral head, or Legg-Calve-Perthes (LCP) disease. It is much more common in boys than girls and is usually unilateral. Pain may be referred to the groin or the knee. Young children are affected more commonly than young adolescents. Etiology is unknown. Management may be surgical, but this is considered on a case-by-case basis. Joint aspiration is useful to rule out septic arthritis as a cause for the symptoms, but radiography and MRI are the cornerstones of diagnosis of LCP disease. Emergency management consists of prompt orthopedic referral or consultation for consideration of surgical management. Leg-length discrepancy, deformity, and limitation of movement are important long-term sequelae. (Figure courtesy of James T. Guille, MD. Reprinted with permission from Guille JT. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:601.)

36 Answer A. The Centor criteria, which have been validated in several trials, are most useful to rule out GAS as the cause of pharyngitis. In several trials, patients with none of the four Centor criteria were found to have had only a 2.5% chance of having a positive throat culture for GAS. In contrast, patients with all four criteria were found to have a 56% chance of having a positive throat culture. Furthermore, as the complications of GAS infection are less common in adults than in children, it seems reasonable that the goal of treating low-risk patients should be symptomatic relief rather than the prevention of adverse sequelae. The four Centor criteria are the presence of fever (before the use of antipyretics), the absence of cough, tender anterior cervical lymphadenopathy, and the presence of exudative tonsillitis. McIsaac et al. modified the score such that patients younger than 15 years old receive an extra point, although a point is subtracted from patients who are older than 45. When these data are applied, patients with a score of 0 to 1 have a 1% chance of having a positive throat culture. In this case (a 22-year-old woman), no modification of her Centor score occurs. Properly implemented throat cultures have a sensitivity $>90\%$. Posterior cervical lymphadenopathy, nonexudative tonsillitis, and atypical lymphocytes are all features of Epstein-Barr virus (EBV) infection, also known as infectious mononucleosis. The presence of a cough, along with other "viral" symptoms such as rhinorrhea and conjunctivitis, also make GAS less likely.

- 37 Answer A. The patient has blepharitis, as seen by the crusting and edema of the upper eyelid. Staphylococcal infection is the most common etiology. Treatment is with gentle soap cleansing and topical erythromycin ointment applied to the eyelids. Topical steroids should never be prescribed by the emergency physician (EP) without ophthalmologic approval. Topical anesthetics (such as proparacaine) should never be prescribed to patients, as they will retard corneal healing. Intravenous ceftriaxone is used in patients with hyperacute bacterial conjunctivitis due to gonococcus. This patient has no evidence of conjunctival involvement on physical examination. Acetazolamide is used in patients with acute angle closure glaucoma, but the absence of eye pain, headache, and corneal or conjunctival abnormality effectively rules this out. (Figure reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:89.)
- 38 Answer E. The perinatal mortality associated with breech presentation has been described to be as high as 25%, although this is largely due to fatal fetal anomalies and premature deliveries. Excluding these anomalies and premature deliveries, breech presentation poses little added risk in the hands of an expert. However, delivery in the ED will always be fraught with additional risks and poorer outcomes due to physician and staff inexperience and the hurried nature of emergent delivery. In breech presentation, the infant is in a longitudinal lie but the head is in the uterine fundus whereas the buttocks are the fetal presenting part. The buttocks are less effective than the fetal head in serving as a wedge to dilate the cervix. Therefore, inadequate cervical dilation is a common problem. As the fetus descends through the cervix, inadequate dilation may result in entrapment of the fetal head. In addition, in complete and footling breech presentations (as opposed to frank breech presentations), the fetus does not completely occlude the cervix, increasing the risk of umbilical cord prolapse (the risk is greatest with footling breech). Cord prolapse is more common in low birth weight or premature infants, which account for almost one third of breech presentations. Finally, there is a relatively small increased risk of hyperextension of the fetal head, which carries a 21% risk of fetal spinal cord injuries, when it occurs.
- 39 Answer B. The patient has evidence of a Monteggia's fracture. Proximal ulnar fracture along with dislocation of the radial head from the capitulum (which may be subtle) is the specific finding. The typical mechanism is a blow to the forearm or fall on outstretched hand. Significant displacement of the radial head can put the patient at risk for radial nerve injury, exhibited by wrist drop. Treatment is surgical in most cases.
- 40 Answer E. Osteomyelitis is a bacterial infection of the bone that generally follows a subacute course. The most common cause is *S. aureus*, but streptococci and gram-negative bacilli are also implicated. Patients usually complain of pain in the affected bone, but do not appear toxic and often lack vital sign abnormalities. The sensitivity of ESR is approximately 90%, and the sensitivity of C-reactive protein may be even higher. Radiographs, although commonly used to evaluate osteomyelitis, have notoriously poor sensitivity in the first week after the onset of symptoms. Bone scintigraphy and MRI are the tests of choice in diagnosing osteomyelitis. MRI is superior to CT scan in characterizing the infection.
- 41 Answer D. Only 5% of intussusception cases occur in adults, and adults are much more likely to have an anatomic abnormality of the intestine. Ninety-five percent of adults have an identifiable abnormality (75% are neoplasms) versus only 2% to 8% in pediatric cases. The classic triad of abdominal pain, vomiting, and bloody stools is only present in one third of pediatric cases. Abdominal radiographs are noninvasive but are usually nonspecific and therefore not useful in making a diagnosis. Ultrasonography is very sensitive, fast, noninvasive, and easy to use. Classically, barium enemas have been the study of choice because they are diagnostic and therapeutic. However, air enemas are equally efficacious and have a decreased rate of perforation, which is the primary complication of either procedure. Therefore, air enemas are preferred by many authors.
- 42 Answer A. History of prior ectopic pregnancy is the strongest risk factor for current ectopic pregnancy. The most common risk factor is pelvic inflammatory disease (PID). The sequelae of PID account for approximately half of all cases of ectopic pregnancy. Although intrauterine device (IUD) use increases the relative risk of ectopic versus intrauterine pregnancy, it decreases the overall risk of all pregnancy significantly. C-section increases the risk of placenta previa, but not of ectopic pregnancy. Oral contraceptive use may reduce the symptoms of PID (thus predisposing to more untreated PID), but overall pregnancy rate (including ectopic) is reduced.
- 43 Answer A. The patient has a lytic lesion with fever in a subacute course consistent with osteomyelitis.

The most common cause in all patients is *S. aureus*. *Salmonella* is more commonly seen in sickle cell patients than healthy patients, but is still not as common as *S. aureus*. *Aspergillus* is a rare cause of septic arthritis. Gonococcus is the most common cause of septic arthritis in the young, sexually active adult. *Pseudomonas* causes osteomyelitis in patients with puncture wounds to the feet and IV drug users.

- 44 Answer D. Lambert-Eaton myasthenic syndrome (LEMS) is an autoimmune disorder which targets presynaptic voltage-gated calcium channel receptors. In contrast, myasthenia gravis (MG) is an autoimmune disorder which targets postsynaptic acetylcholine receptors. In both cases, muscle weakness is the most predominant clinical feature. However, in MG, ptosis or diplopia is the most common initial symptom. In LEMS, ocular symptoms are uncommon and proximal muscle weakness of the lower extremities more than the upper extremities is the most common presentation. This results in difficulty rising from a seated position and climbing stairs. Autonomic dysfunction is a common finding in patients with LEMS, but not MG. LEMS may occur sporadically, but it occurs as a paraneoplastic syndrome in 50% to 70% of patients. In these patients, it is most commonly associated with small cell lung carcinoma. Finally, DTRs in patients with MG tend to be preserved, but they are typically drastically reduced or absent in patients with LEMS. Briefly exercising the muscles involved in the reflex before reflex testing, however, may result in restored or normal reflexes.

- 45 Answer E. Subdural hematomas occur due to disruption of the cranial bridging veins from trauma, causing blood to collect deep to the dura. The elderly are at much higher risk than the average population due to brain atrophy which causes these bridging veins to stretch and be susceptible to even minor trauma. Due to this low pressure venous bleeding, patients with subdural hematoma may have a subacute or chronic presentation with mild initial clinical manifestations of injury. Patients with epidural hematoma, on the other hand, usually have an arterial source and exhibit signs and symptoms almost immediately after the trauma. Some patients with subdural hematoma, especially the elderly and alcoholics, may not even recall their antecedent head trauma. Many patients with subdural hematoma have a lucid interval (where the mental status is completely normal before becoming altered again), which is more classically thought to be associated with epidural hematoma. Coma, focal neurologic deficits, and increased intracranial pressure are associated with both subdural and epidural hematomas.

- 46 Answer A. Traumatic hemothorax may occur after both blunt and penetrating thoracic trauma. Hemorrhage results most often from parenchymal vessel damage, then intercostal and internal mammary artery lacerations, and uncommonly from great vessel injury. At least 200 mL of blood must be present for costophrenic angle blunting to appear on upright chest x-ray. Tube thoracostomy with a large chest tube (36-French or greater) at the fifth intercostal space and midaxillary line is the treatment of choice. Smaller tubes will cause blood to clot and prevent adequate drainage. Pneumothorax occurs concomitantly in almost a third of hemothoraces and requires suction drainage. Initial chest tube drainage of 1,500 mL, 250 mL per hour of drainage over 4 hours, worsening hemothorax, hemodynamic instability, and cardiac arrest are all indications for thoracotomy.

- 47 Answer C. Myocarditis is most commonly postviral, including Coxsackie B, adenovirus, and influenza. Bacterial and protozoal pathogens are less common etiologies. More than half the number of patients report an antecedent nonspecific viral syndrome. Acute symptoms include myalgias, fever, fatigue, chest pain, and shortness of breath, but none of these is present in most cases. Myocarditis may lead to dilated cardiomyopathy, causing overt heart failure. Leukocytosis is uncommon, EKG findings are nonspecific, and echocardiogram may show evidence of global hypokinesia. The gold standard for diagnosis is endomyocardial biopsy, but there are many false negatives due to the patchy nature of the inflammation.

- 48 Answer E. Digitalis inhibits the membrane Na-K ATPase which normally functions to pump sodium out of the cell and potassium into it. Digitalis therefore increases intracellular sodium and decreases intracellular potassium. The increased intracellular sodium causes an increase in intracellular calcium, which produces a positive inotropic effect. In therapeutic doses, digitalis reduces the heart rate and can cause slight ST depression and T-wave inversions.

- 49 Answer C. Gastroesophageal reflux disease (GERD) is a very common cause of vomiting during infancy. Emesis is typically nonbilious and begins in early infancy, remaining fairly constant over time. It does not demonstrate the progressive pattern to projectile emesis that characterizes pyloric stenosis. Most infants respond to conservative measures. However, if those measures fail, infants frequently respond to ranitidine (an H₂ histamine receptor antagonist) or metoclopramide (which increases

lower esophageal tone and gastric emptying). Most infants continue to gain weight normally and only rarely do infants demonstrate failure to thrive. For the most part, infant GERD peaks at 4 months and resolves by 12 months with nearly all cases resolved by 24 months of age (as the lower esophageal sphincter becomes more competent with age).

50 Answer C. Due to its anterior position and size, the right ventricle is the most commonly affected cardiac chamber from penetrating thoracic injury. The left ventricle is affected next, followed by both atria equally. Multiple chambers are injured in almost one third of cases. Death occurs from either exsanguination or pericardial tamponade, the latter of which is treated by ED thoracotomy and pericardial incision.

51 Answer D. The SIRS was devised to be able to formally describe basic vital sign and laboratory abnormalities associated with severe inflammation, such as infection, trauma, burns, and severe medical illness. SIRS is said to be present when two out of the following four criteria are present:

- Temp $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$.
- WBC $>12 \text{ K}$ or $<4 \text{ K}$ or $>10\%$ bands.
- RR >20 or $\text{Paco}_2 <32$.
- HR >90 .

Sepsis is the presence of SIRS with a suspected or proven infectious cause. *Septic shock* is defined as sepsis plus inadequate tissue perfusion, which may be manifested as hypotension or end-organ dysfunction. Note that hypotension is *not* a criterion for SIRS or sepsis, but is present in most cases of septic shock.

52 Answer E. A history of a persistent, foul-smelling, bloody vaginal discharge is highly suggestive of a vaginal foreign body. Although the history of a bloody discharge is helpful, few patients remember placing a foreign body in their vagina and few parents witness the act. Therefore, ED physicians should have a high degree of suspicion whenever a patient presents with a foul-smelling bloody discharge. Although many foreign bodies have been documented, small wads of toilet paper are most common. Simple removal followed occasionally by local irrigation, if necessary, is all that is required. Antibiotics are not usually necessary unless a concomitant infectious vulvovaginitis is present. Poor perineal hygiene is the leading cause of vulvovaginitis in the pediatric population. Bacterial pathogens responsible for the infection are typically nonspecific. If the predominant symptom is pruritus, pinworms (*Enterobius*) should be suspected.

53 Answer C. This patient has a pheochromocytoma. Pheochromocytomas are catecholamine producing tumors that account for $<1\%$ of cases of hypertension. They are most commonly found in the adrenal medulla although 10% are extra-adrenal (the rule of "10s" in pheochromocytoma: 10% bilateral, 10% malignant, 10% extra-adrenal, 10% associated with familial disorders, e.g., multiple endocrine neoplasia). The diagnosis is based on detection of urinary metanephrines and vanillylmandelic acid (VMA) and has a diagnostic sensitivity of 98% for detecting pheochromocytoma. Assays for plasma metanephrines may also be performed. Finally, CT or MRI is used for tumor localization. Hypertension has traditionally been treated with phenoxybenzamine, an α -blocker, whereas β -blockers should be avoided (β -blockers lead to unopposed α stimulation which may result in a worsening of hypertension). Due to associated peripheral edema and orthostatic hypotension, other α -blockers have also been used such as terazosin or doxazosin.

54 Answer B. This patient has Dysfunctional uterine bleeding (DUB), which is defined as excessive, prolonged, or erratic uterine bleeding that is not related to an underlying anatomic uterine defect or systemic disease. Therefore, DUB is a diagnosis of exclusion. However, anovulation is by far the most common cause of irregular vaginal bleeding in an adolescent. Although anovulatory menstrual cycles are most common in the first 2 to 3 years after menarche, it may take up to 6 years before most cycles become ovulatory. Oral contraceptive pills are very effective for the management of DUB. Nearly any regimen can be used, and the most common involves combination oral contraceptives (containing both estrogen and progesterone) with at least 30 to 35 mg of ethinyl estradiol. The pills are initially used four times daily in women with more extensive bleeding (and concomitantly low hemoglobin levels) and are gradually tapered by one pill every 3 days until only one pill is being used on a daily basis. Antiemetics may be needed due to the nausea that is a frequent side effect of high-dose estrogen therapy. In addition, iron supplementation should be used to boost red blood cell production.

55 Answer E. Although acute pharyngitis is a common reason for presentation to the emergency room, GAS is the cause of a minority of infections, ranging from 5% to 30% (estimated to be 5% to 10% in adults, as it is a less common cause of adult pharyngitis than pediatric pharyngitis). GAS is, however, the most common bacterial cause of the disease and, regardless of the etiology, it is the only common

cause that requires treatment. As the pharyngitis is self-limited—with or without treatment, the reason for treating GAS pharyngitis is to prevent the sequelae of the disease, primarily acute rheumatic fever. Acute rheumatic fever is a nonsuppurative complication of GAS pharyngitis. The other rare nonsuppurative complications include poststreptococcal glomerulonephritis (PSGN) and streptococcal toxic shock syndrome. Suppurative complications include peritonsillar cellulitis or abscess, otitis media, sinusitis, necrotizing fasciitis, and meningitis. The ability of antibiotic therapy to prevent the development of suppurative complications is not well defined, but the effect is thought to be small. However, antibiotics are thought to be more effective in reducing the rate of acute rheumatic fever, and they have been shown to decrease the length and severity of acute GAS pharyngitis. There is no definitive evidence that antibiotic therapy reduces the rate of PSGN. Acute rheumatic fever typically occurs 2 to 4 weeks after acute pharyngitis develops, and most commonly occurs in children 4 to 9 years old. The diagnosis of rheumatic fever is made in the presence of one or more of the five major Jones criteria in association with an antecedent GAS pharyngitis. The major Jones criteria include: pancarditis, migratory arthritis, CNS involvement (classically Sydenham's chorea), erythema marginatum (diffuse rash sparing the face), and subcutaneous nodules.

56 Answer D. Aplastic anemia causes normocytic anemia and pancytopenia due to immune-mediated bone marrow destruction. It is caused by drug or toxin exposure in half of all cases, and viral and primary immune etiologies make up the remainder. Chloramphenicol is the drug most often associated with aplastic anemia. Other medications implicated include antiepileptics and sulfonamides. Most other antibiotics do not predispose to aplastic crises.

57 Answer D. This patient has Epstein-Barr virus (EBV) pharyngitis, also known as *mononucleosis*. As it is a viral infection, antibiotics have no role in treatment. Furthermore, the specific use of amoxicillin may result in the development of a morbilliform (i.e., measles-like) rash. Although this does not represent a true allergy, nor is it dangerous to the patient, it is an irritating and unnecessary outcome. The tonsillitis in EBV infections is nonexudative and may be considerably large, rarely resulting in airway obstruction.

58 Answer E. There are several normal physiologic changes that occur with aging and that place elderly patients at greater risk of serious injury from trauma. Cerebral atrophy results in stretching

of the dural bridging veins, increasing the risk of subdural hematoma formation after falls and relatively minor head trauma. Degenerative joint disease and osteoporosis result in an increased tendency to fracture bones after falls and blunt trauma. Due to these degenerative changes, the cervical spine is less mobile in elderly patients and is more commonly fractured. Type 2 odontoid fractures are the most common cervical spine fractures in the elderly. In addition, hyperextension injuries lead to central cord syndrome in which the ligamentum flavum is thought to buckle into the spinal cord, resulting in a contusion to the cord's central elements. This results in flaccid paralysis of the upper extremities but relatively unaffected lower extremities (although they may suffer from spastic paralysis in large cord lesions). The chest wall becomes more rigid and the lungs become less compliant in elderly patients. This places them at risk for flail chest, even from relatively minor injuries such as a simple fall. Elderly patients with even single rib fractures should be admitted in the setting of concomitant lung disease such as COPD.

59 Answer C. Magnesium depresses the CNS and slows nerve conduction. It is used in preeclampsia to prevent progression to eclampsia, which is characterized by the presence of seizures. Magnesium slows neuromuscular conduction and decreases CNS irritability. Remembering this provides an easy means of remembering the actions of magnesium. It will decrease the respiratory rate, decrease deep tendon reflexes, and decrease the degree of consciousness. The loss of deep tendon reflexes is generally the first sign of magnesium toxicity.

60 Answer B. *Meningococcemia* refers to systemic infection with *Neisseria meningitidis*, a gram-negative diplococcus. Mortality is as high as 50%, due to multiorgan failure from septic shock which can occur within hours. Fever and rash occur in most patients. Fifty percent of patients present with true petechiae, and another 20% to 30% exhibit a maculopapular rash which later turns into petechiae or purpura. Bilateral adrenal infarction, part of a constellation of signs known as the *Waterhouse-Friderichsen syndrome*, occurs in approximately 10% of cases. Hypothermia, seizure, and arthritis each occurs <10% of the time. Laboratory studies may demonstrate a significant leukocytosis (although leukopenia, when present, is a poor prognostic indicator), thrombocytopenia, and disseminated intravascular coagulation (DIC). Treatment is with a third-generation cephalosporin and aggressive management of shock (fluids, vasoactive agents, intensive care unit [ICU] monitoring).

- 61 Answer A. There is considerable overlap in the clinical presentation of patients with acute cholecystitis and acute cholangitis. However, patients with acute cholecystitis rarely exhibit jaundice and tend to be less toxic-appearing. Although the cystic duct is usually blocked in acute cholecystitis, the hepatic and common bile ducts are patent and free of infection and inflammation. Charcot's triad (fever, right upper quadrant pain, jaundice) is the hallmark of acute cholangitis. Fever is nearly universal, present in 95% of patients, right upper quadrant tenderness in 90% and jaundice in 80%. Hypotension and altered mental status are present in 15% of patients and suggests gram-negative sepsis. When present in concert with Charcot's triad, these findings are known as *Reynold's pentad*. Although mildly elevated bilirubin levels may be present in patients with acute cholecystitis, these levels rarely rise above 4 mg per dL.
- 62 Answer C. The patient is at risk for traumatic aortic injury (TAI), which is a common cause of immediate death in motor vehicle crashes. TAI may result in sudden hemodynamic instability and death in patients who initially appear to be stable after blunt trauma. Lateral and front-impact motor vehicle crashes at high speed, steering wheel impact to chest, and sudden deceleration injuries each constitutes a high-risk mechanism for TAI. Although a normal chest x-ray has good sensitivity (~90%), patients who have a high-risk mechanism and symptoms consistent with the diagnosis of TAI should undergo CT angiography (negative predictive value of close to 100%). Diagnostic peritoneal lavage is usually indicated in patients who are hemodynamically unstable to evaluate for presence of intraperitoneal injury. Pericardiocentesis is only indicated in patients with pericardial tamponade in whom a pericardial window may not be performed at the bedside. Admission to the hospital could eventually be indicated, but a delay in the diagnosis of TAI could cause immediate death, and observation alone would be unhelpful in prevention of this occurrence. Discharging the patient home without any further workup for either TAI or blunt cardiac injury is contraindicated in a patient with such a high-risk mechanism and suggestive symptoms.
- 63 Answer B. The lateral wrist radiograph demonstrates volar displacement and angulation of the lunate relative to the radius, indicating a lunate dislocation. The "spilled teacup" sign is present with the lunate appearing as a teacup that is tilted forward. Treatment involves orthopedic consultation and urgent surgical repair. Scaphoid fractures are best seen on an anteroposterior (AP) wrist or dedicated scaphoid view. Perilunate dislocation involves the capitate dislocating relative to the lunate and radius. Distal radius fractures and metacarpal fractures are best seen on AP views. (Figure courtesy of Silverberg M. *Greenberg's Text-Atlas of Emergency Medicine*, Lippincott Williams & Wilkins; 2005.)
- 64 Answer B. Coumadin directly inhibits vitamin K-mediated synthesis of the following factors: II, VII, IX, and X. Indirect inhibition of factor I (fibrin) also occurs due to the downstream effects of reduced levels of factor II (prothrombin). The prothrombin time is prolonged in patients who are taking coumadin and is used to track therapeutic anticoagulation.
- 65 Answer D. The fact that cooling improves the symptoms of myasthenia gravis (MG) is the basis for the "ice test." When ptosis is present, an ice pack is placed over the affected eye for 2 minutes. It is thought that the local cooling results in a slowing of the kinetics of the acetylcholine receptor, allowing for a prolonged effect of acetylcholine and an improvement in symptoms. In clinical studies, 80% of patients with ptosis due to MG experienced some improvement with a locally applied ice pack. MG has a bimodal peak of incidence with the first peak in the 20s and the second peak in the 50s. Interestingly, women are more commonly affected during the first peak, but men are more commonly affected in the second peak. Sensory loss is not a feature of MG. The most frequent initial symptoms of MG are ptosis and diplopia due to ocular muscular weakness or weakness of the levator palpebrae superioris.
- 66 Answer E. Compartment syndrome refers to ischemia that occurs in extremities when pressure in the soft tissues exceeds that of the microcirculation. Such high pressures occur from either increased contents in the compartment or external compression. Normal compartment pressure is zero, and pressures >30 mm Hg are usually enough to predispose to compartment syndrome. Long bone fractures are the usual reason for compartment syndrome, causing extravasated blood and soft tissue edema to accumulate. Tibial fracture is the single most common cause of compartment syndrome, but all the other regions listed can also be involved. The most common symptoms are pain and paresthesias. Diminished pulses generally occur only in extremely advanced cases, as pressure in compartment syndrome is usually well below arterial pressure. Diagnosis is made by directly measuring compartment syndromes with a Stryker needle device. Treatment is with urgent fasciotomy.

- 67** Answer C. *A. haemolyticum* usually affects the 10- to 30-year-old age-group and may cause an infection which is impossible to differentiate from GAS pharyngitis with rash (also known as scarlet fever). In a patient in the appropriate age-group with all the signs and symptoms of GAS pharyngitis or scarlet fever, but with a negative throat culture and a poor response to therapy, *A. haemolyticum* should be considered. The drug of choice is erythromycin, as response to penicillin is generally poor, but highly variable. On occasion, dermatologic findings may be the only manifestation of *A. haemolyticum* infection, including scarlatiniform and urticarial rashes as well as erythema multiforme. In addition, *A. haemolyticum* may cause a membranous pharyngitis that closely resembles diphtheria. Despite years of use to treat GAS pharyngitis, penicillin resistance has not developed among GAS isolates. Epstein-Barr virus (EBV) is associated with a nonexudative tonsillitis, posterior lymphadenopathy, splenomegaly, and an increased number of atypical lymphocytes on the peripheral blood smear. Both *M. pneumoniae* and *C. pneumoniae* may cause pharyngitis that typically occurs in epidemics due to crowded conditions.
- 68** Answer E. The figure demonstrates a tympanic membrane (TM) perforation in the setting of head trauma. Treatment of traumatic TM perforations in a dry environment is purely supportive with close ENT follow-up. Perforations in a wet environment require prophylaxis with antipseudomonal antibiotics. Perforations associated with preceding symptoms of otitis media also require standard antibiotic therapy with an aminopenicillin. All patients should be instructed to keep the ear canal dry. Healing of TM perforations occurs over several weeks to months. (Figure from Benjamin B, Bingham B, Hawke M, et al. *A color atlas of otorhinolaryngology*. Philadelphia: JB Lippincott Co; 1995. Artwork © Bruce Benjamin, Brian Bingham, Michael Hawke, and Heniz Stammberger, with permission.)
- 69** Answer C. Patients with smoke inhalation from building fires are exposed to two major toxins, carbon monoxide and hydrogen cyanide. A metabolic acidosis with elevated lactate level in these patients is highly suggestive of dual toxicity. Carbon monoxide binds to hemoglobin with more than 200 times greater affinity than oxygen, and prevents hemoglobin from carrying oxygen. Cyanide poisons complex IV of the mitochondrial electron transport chain. Treatment of carbon monoxide alone is 100% oxygen and hyperbaric oxygen in severe cases. Treatment of hydrogen cyanide alone involves two major steps: Induction of methemoglobinemia with nitrites, which pulls the cyanide molecule off the electron transport chain, and detoxification of cyanide with thiosulfate. When there is poisoning with both cyanide and carbon monoxide, induction of methemoglobinemia by nitrites should be avoided, as it would further prevent hemoglobin from carrying oxygen. The treatment of choice in this case would be sodium thiosulfate. Methylene blue is the treatment for severe methemoglobinemia. Dexamethasone has no role in the management of carbon monoxide or cyanide poisonings.
- 70** Answer A. Infection and local irritation often exacerbate gingival hyperplasia caused by drugs such as phenytoin. Poor oral hygiene is cited as the most important contributing factor. Less than half of all patients on phenytoin exhibit gingival hyperplasia and the reaction is not dose related. Calcium channel blockers such as nifedipine have also been implicated.
- 71** Answer D. Globe rupture is a true ophthalmologic emergency, usually requiring operative care. Antibiotics and tetanus boosters should be given to all patients with suspected globe rupture to prevent infectious complications. Succinylcholine without pretreatment with nondepolarizing paralytics can increase intraocular pressure. Tonometry is contraindicated as this will also increase intraocular pressure. Eye shielding is mandatory to prevent further damage to the injured eye and to restrict eye movement.
- 72** Answer B. More than three fourths of all patients with AIDS will develop *Pneumocystis carinii* pneumonia (PCP) at some point in their lifetimes. It is also the most common identifiable cause of death in AIDS patients. *Pneumocystis* is classified as a protozoan, but has many characteristics of a fungus. Symptoms of PCP, like all pneumonias, include fever, cough, and shortness of breath, but a subacute or mild course is characteristic. Chest radiography classically demonstrates diffuse, bilateral interstitial infiltrates, but can be completely normal up to 20% of the time. First-line therapy is with TMP-SMX. Corticosteroids are indicated in patients who have significant hypoxia. Pentamidine, dapsone, or clindamycin plus primaquine may be used as alternatives. The other answer choices are all common opportunistic infections in AIDS patients, but occur less often than *Pneumocystis*.
- 73** Answer D. Acute angle-closure glaucoma is caused by increased pressure in the anterior chamber due to decreased outflow of aqueous humor. Acetazolamide can increase the excretion of aqueous humor and is

indicated as one of the medical therapies, along with pilocarpine, timolol, and antiemetics. Cycloplegics inhibit ciliary muscle contraction (which limits miosis), and are contraindicated in glaucoma, as they further inhibit aqueous humor outflow from the anterior chamber. Aspirin and antivirals play no role in the management of glaucoma. Lateral canthotomy is used to treat retrobulbar hematoma. Definitive therapy for acute angle closure glaucoma is surgical and emergent ophthalmologic consultation is necessary.

74 Answer C. There is some variability in the literature regarding the definition of massive hemoptysis. Most authors define massive hemoptysis as expectorated blood >600 mL per 24 hours. Since it is impossible to accurately quantify the amount of bleeding before presentation, a supplemental definition is hemoptysis occurring in the ED >100 mL with signs of respiratory distress. Chest x-rays are normal or nonlocalizing in up to 40% of patients with hemoptysis. In such patients, a combination of high-resolution CT, bronchoscopy, or ventilation/perfusion (\dot{V}/\dot{Q}) scanning is typically able to diagnose the cause of hemoptysis. Bleeding may come from alveolar capillaries, bronchial capillaries, bronchial arteries, or pulmonary arteries. Bleeding from bronchial and alveolar capillaries is usually the result of infection and inflammation. Bleeding from pulmonary arteries is rare, and may occur when tumors erode into the pulmonary vasculature. The higher systemic pressure bronchial arteries are the source of bleeding in 90% of cases of massive hemoptysis. Most authors recommend keeping the affected lung in the dependent position in cases of hemoptysis limited to one lung. This prevents flooding of the unaffected lung with blood, thereby maintaining adequate ventilation and preventing complications related to aspiration. Bronchial artery embolization is the most effective nonsurgical treatment of massive hemoptysis. Angiography is used to localize the bleeding followed by the injection of embolizing materials such as Gelfoam or steel coils to stop bleeding. The 24-hour success rate approaches 98%. Although 16% of patients may experience rebleeding over the next 30 days, bronchial artery embolization will at least serve as a bridge to more definitive surgical management in such patients. Despite this, a thoracic surgical consult is recommended in all cases of massive hemoptysis.

75 Answer A. The image shows sigmoid volvulus. Sigmoid volvulus is primarily a disease of the elderly as well as patients in long-term care facilities and patients with neurologic or psychiatric disease. It is thought that medications used to treat psychiatric and neurologic disease may have detrimental effects

on colonic motility predisposing to volvulus. It is also frequently associated with chronic constipation. Patients with small bowel obstruction usually have a history of vomiting, and plain films would reveal circumferential plicae circularis instead of non-circumferential haustrae of the large bowel. Intussusception is rare in adults and x-ray findings are neither sensitive nor specific. Diabetic gastroparesis would demonstrate a large gastric bubble or dilation rather than colonic dilation. Almost all patients with Hirschsprung's disease are diagnosed before the age of two. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999.)

76 Answer E. Patients younger than 8 weeks of age with fever should be admitted to the hospital for observation, culture analysis, and prophylactic antibiotics. In this age-group, serious bacterial infection is common and often completely undetectable by physical examination or routine blood tests. Patients between 8 and 12 weeks may be assessed for toxic appearance before further evaluation, but aggressive management with cultures and antibiotics in this population is preferable. The potential presence of otitis media should never result in outpatient management of the febrile neonate. Antibiotic administration without appropriate culture and laboratory analysis results in the inability to diagnose serious bacterial infection.

77 Answer A. Only 5% of intussusception cases occur in adults and almost all of them occur in the small intestine. In contrast to pediatric patients, adults with intussusception almost always have an identifiable lead point, which is a malignancy 75% of the time (other lesions include inflammatory lesions and Meckel's diverticulum). In adults, the diagnosis is best made with a CT scan. Although barium or water contrast enemas may diagnose and reduce intussusception, it is not as useful in adults because most lesions are in the small intestine and it is thought that the contrast material may help spread malignant cells. Most patients present with signs of incomplete obstruction (only 20% of patients have complete obstruction) with a chief complaint of abdominal pain. Large bowel obstruction in adults is most commonly due to malignancy, with volvulus and diverticulitis being the next most common causes.

78 Answer E. Patients receiving angiotensin converting enzyme (ACE) inhibitors are at risk for developing angioedema, which is a nonpitting, symmetric edema that typically involves the face, tongue, and supraglottic tissues. Most patients present with lip and tongue swelling and do not have either urticaria

or pruritus. The response is most common within the first week of therapy but can occur months or years after starting the drug. It is not safe for patients developing angioedema due to ACEI therapy to take angiotensin-receptor blockers. Finally, patients with angioedema due to ACEI therapy may be resistant to all first-line agents for anaphylaxis including epinephrine, corticosteroids, and antihistamines. Symptoms typically resolve within 24 to 48 hours of discontinuation of the drug, but elective intubation should be performed early in the course if there is any sign of respiratory compromise. Typical "rescue" airways may fail in angioedema due to edema of the glottic structures. Therefore, ENT and anesthesia should be involved in the case, and intubations without the use of paralytics should be considered.

79 Answer C. The patient has been adequately evaluated for bony injury of her cervical spine, including cervical spine x-rays and CT scan. However, ligamentous injury has not yet been ruled out. A flexion-extension series or MRI may be used to evaluate for ligamentous injury. The patient has a pacemaker, which is a contraindication for MRI, so a flexion-extension series is indicated. Subluxation seen on flexion-extension films is indicative of a significant ligamentous injury and must be evaluated by a spine surgeon before discharge planning. Oblique films add nothing to the evaluation of ligamentous injury and are useful only to evaluate for laminar fracture or unilateral facet dislocation. Additionally, reasons for the motor vehicle collision should be aggressively sought—with a recent pacemaker placement for sick sinus syndrome, pacemaker malfunction and dysrhythmia causing syncope may be the causative process. Discharge, therefore, should not take place before both medical and traumatic issues are completely evaluated. Patients may be discharged with a soft collar for 1 to 2 days to help with muscle spasm, but should never be discharged with a hard collar in the absence of ligamentous or bony injury, as this will quickly lead to neck muscle atrophy.

80 Answer D. Patients with moderate traumatic pneumothoraces (>20%) generally require tube thoracostomy to remove intrapleural air and prevent conversion to a tension pneumothorax. Small pneumothoraces (<15%) may be managed conservatively, with supplemental oxygen and observation, but should be monitored carefully for signs and symptoms of deterioration. Needle thoracostomy is only indicated in patients with tension pneumothorax who are hemodynamically unstable and require immediate decompression. Chest tubes are ideally

placed in the fourth or fifth intercostal space at the mid- or anterior axillary lines to minimize cosmetic defects. A large tube (36-French or larger) should be placed in adults with traumatic pneumothoraces in case a hemothorax is also present.

81 Answer C. Patients with suspected urinary tract infections require either urethral catheterization or a midstream clean catch specimen for adequate sampling and culture. In a 12-month-old child, midstream clean catch would be extremely difficult. Diaper and bag collection methods are notoriously nonspecific and should never be used. Suprapubic catheterization would be necessary only in cases of urethral anatomic abnormalities where direct urethral catheterization would be contraindicated.

82 Answer D. There are numerous risk factors for pulmonary embolism (PE), which can be divided into inherited and acquired disorders. Inherited hypercoagulable disorders should be suspected in patients with a documented PE who are younger than 40 years old, or in similar patients who have a positive family history or who have recurrent PEs. Of the inherited disorders, factor V Leiden is the most common, and may be present in as many as 20% of patients with venous thromboembolic disease. In normal individuals, factor V is normally inactivated (along with factor VIII) by protein C, thereby disrupting the normal clotting cascade. Patients with factor V Leiden have a factor V protein that is resistant to inactivation by protein C, which allows the coagulation cascade to continue in an unregulated manner resulting in a thrombophilic state. Plasminogen deficiency and protein S deficiency are also inherited disorders that increase the risk of thromboembolic disease, but they are far less common. Nephrotic syndrome is also associated with an increased risk of PE due to a relative deficiency of coagulation cascade regulatory proteins, which are lost in the urine. Cancer in any form is a well-described risk factor for PE.

83 Answer A. Patients with tibial shaft fractures usually have concomitant fibular fractures as well, due to the close proximity of the two bones. Mechanism of injury usually involves direct trauma; only rarely do pathologic fractures occur in the tibia. Due to the sparse soft tissue surrounding the anterior surface of the tibia, fractures are often open and require emergent operative repair. The most common site for compartment syndrome is in the leg, due to tibial fracture. The common peroneal nerve is the most common nerve to be injured in tibial fractures, but this does not occur in most patients. Vascular compromise with tibial fractures is rare, but when present, mandates aggressive management.

- 84 Answer B. Oblique views of the cervical spine do not generally add significant sensitivity to the standard three-view cervical spine series (lateral, AP, odontoid). Their primary utility is in identifying fractures of the lamina and better characterizing unilateral facet dislocations. Both these injuries may also be identified with CT scan, rendering oblique views less useful in current trauma evaluations of the cervical spine. Spinous process and pedicle fractures are best seen on the lateral view. Vertebral body fractures are seen well on the AP and lateral views. Dens fractures are the primary reason for obtaining the open-mouth odontoid view of the cervical spine.
- 85 Answer D. A large percentage of women, estimated to be from 30% to 60%, experience abdominal pain approximately 1 week after starting methotrexate for ectopic pregnancy. This is known as *separation pain* as it is thought to result from tubal distension as a result of tubal abortion or hematoma formation. However, all women with a history of methotrexate treatment for ectopic pregnancy who present with abdominal pain merit further investigation by ultrasonography to explore the possibility of tubal rupture. Interestingly, the size of the ectopic mass may actually increase before involution, but this finding has not been shown to be associated with treatment failure. However, if patients have an increase in the amount of pelvic free fluid or a decrease in their hemoglobin, a presumptive diagnosis of tubal rupture should be made and an OB should be urgently consulted. Although it is a risk factor for ectopic pregnancy, active PID at the same time as pregnancy (ectopic or intrauterine) is extremely rare.
- 86 Answer B. Coronary vasospasm is an important cause of nonatherosclerotic MI. It may be idiopathic or caused by certain drugs, such as cocaine or vasopressin. It is clinically indistinguishable from coronary thrombosis and can only be diagnosed with cardiac catheterization. Treatment in the ED should be exactly the same as a STEMI due to coronary occlusion.
- 87 Answer A. People ingest packets of illicit drugs to evade law enforcement officials by two main methods—packing and stuffing. Body packers ingest large amounts of drug in well-sealed packets in a methodical manner; body stuffers, on the other hand, are under time pressure to ingest a small number of packets quickly to avoid being captured with the drugs in their possession. Body packers are less likely than body stuffers to have packets rupture, but more likely to die from ruptured packets, as they usually contain a large amount of drug. Management of asymptomatic patients involves diagnosis with oral contrast radiographs, followed by bowel irrigation with polyethylene glycol and admission to a monitored bed. Charcoal may be of benefit in symptomatic patients shortly after packet ingestion. Hemodialysis is used only if packets have ruptured and drug has been absorbed, but cannot be set up quickly enough in these patients, as death will be sudden. Endoscopic removal is rarely indicated as rupture may occur during packet withdrawal. Operative removal is emergently indicated in patients with any symptoms suggestive of cocaine packet rupture, as uncontrolled sympathomimetic crisis will cause death despite even the most aggressive non-surgical measures.
- 88 Answer B. The patient has central retinal artery occlusion (CRAO), probably caused by a thromboembolus from atrial fibrillation or carotid atherosclerosis. The conditions listed in her past medical history are all risk factors for CRAO. Intermittent globe massage is indicated to increase ocular carbon dioxide content, which leads to vasodilation of the retinal arteries. Lateral canthotomy is used to treat retrobulbar hematoma and has no role in management here. Aspirin, heparin, and TPA have not been shown to improve outcomes in CRAO.
- 89 Answer D. Corneal abrasions should be treated with prophylactic topical antibiotics. Short-term cycloplegics may also be used to reduce the ciliary spasm associated with many abrasions. Eye patching has been shown to increase infection rates. Topical anesthetics impede corneal healing if used beyond the acute setting. Topical steroids are indicated only in cases of iritis and are absolutely contraindicated when the possibility of herpetic infection exists. Topical saline solution may be used in corneal abrasions as a remoisturizing medium, but does not reduce superinfection rates or improve healing.
- 90 Answer C. Lumbar puncture in healthy adults is normally 8 to 18 cm of water. Children have a normal range of 3–6 cm of water. Opening pressure can only accurately be measured in the lateral decubitus position.
- 91 Answer D. All pregnant patients with a viable fetus (defined as 24 weeks gestation and beyond) require continuous cardiotocographic monitoring for 4 hours before discharge. Even in the setting of "minor" trauma, approximately 4% of pregnant patients will develop placental abruption. In the setting of major trauma or in the presence of vaginal bleeding or any uterine contractions, patients

should be admitted for 24 hours of cardiotocographic monitoring. Cardiotocographic monitoring is the most sensitive indicator of trauma-related fetal distress. Furthermore, as the fetus is more sensitive than the mother to decreases in maternal blood pressure and blood flow, fetal distress can be an early indicator of occult maternal shock. Most fetal losses in trauma occur due to placental abruption and cardiotocographic monitoring is the most sensitive marker of fetal distress due to abruption. In contrast, ultrasonography is notoriously insensitive, detecting only 50% of placental abruptions. Finally, in patients with a *nonviable* fetus, intermittent documentation of fetal heart tones, as well as ultrasonography to assess fetal viability are probably adequate.

92 Answer C. UGIB is defined as bleeding that originates proximal to the ligament of Treitz. It usually manifests as hematemesis or melena, but brisk UGIBs can cause hematochezia as well. Peptic ulcer disease (PUD) accounts for 50% to 80% of UGIB. Esophageal varices are the most common cause of "severe and persistent" bleeding, accounting for 33% of such cases. After PUD, gastric erosions and varices are the next most common causes of UGIB. The etiology remains uncertain in some cases as well.

93 Answer E. The patient has an infected kidney stone, which, at 7 mm, is very unlikely to pass spontaneously. This represents a true emergency and will likely require specific urologic management. The patient should be admitted to the hospital and given intravenous fluids, analgesics, antiemetics, and antibiotics after urinary culture has been sent. Other indications for emergent urologic consultation in patients with kidney stones are the presence of acute renal failure, high-grade obstruction due to the calculus in a patient with only one kidney, and a stone >5 mm with intractable symptoms of pain and/or nausea. Discharging the patient with an infected kidney stone without urologic approval is contraindicated. MRI will not add significantly to this patient's diagnosis or management and is an unnecessary waste of time.

94 Answer A. Pelvic inflammatory disease (PID) is an infection of the fallopian tubes. Risk factors include young age (15 to 25 is the highest risk group), multiple sexual partners, smoking, and bacterial vaginosis. It is caused by *Chlamydia*, gonococcus, and organisms which cause bacterial vaginosis. The peak time of onset is within 1 week of menses, as menstrual flow is thought to provide an optimal culture medium for bacterial ascension. Symptoms include diffuse pelvic pain, fever, nausea, vomiting, vaginal discharge, and dyspareunia. Patients usually exhibit

bilateral adnexal tenderness with significant cervical motion tenderness and cervical discharge. PID is a clinical diagnosis with laboratory and imaging studies useful only to rule out other causes of symptoms. Treatment involves antibiotics to cover *Chlamydia* and gonococcus—the most common regimen is IM ceftriaxone plus doxycycline/azithromycin. Sequelae of untreated PID are extremely serious, including tubal scarring causing infertility and ectopic pregnancy, chronic pelvic pain, and tubo-ovarian abscess.

95 Answer C. The Pneumonia Severity Index (PSI) is a scoring system which was first developed in a retrospective, observational study by Fine et al. in 1997. The aim of the study was to develop a rule to identify patients with low 30-day mortality from community-acquired pneumonia. Calculating the PSI is a two-step process. In step one, the physician determines if a patient has any "high-risk" criteria, the presence of which is independently associated with mortality. These criteria include patients older than 50, any of five comorbid diseases (neoplastic disease, congestive heart failure, cerebrovascular disease, renal disease, and liver disease), and five physical examination findings (altered mental status, pulse ≥ 125 per minute, respiratory rate ≥ 30 per minute, systolic blood pressure < 90 mm Hg, and temperature, $< 35^\circ\text{C}$ or $\geq 40^\circ\text{C}$). Patients without any of these criteria are classified as risk class I. All other patients are assigned to risk classes II, III, IV, or V based on the number of points calculated in step 2 of the PSI. In step 2, patients are assigned points for each risk factor that they have. Of all factors, age is the most heavily weighted in calculating the PSI.

96 Answer D. Contrast-induced nephrotoxicity occurs more often in patients who have preexisting renal insufficiency, diabetes, hypovolemia, and multiple myeloma. Age is also an independent risk factor for development of contrast-induced acute tubular necrosis. Prevention is with adequate hydration, limiting the dose of the contrast material, and pretreatment with N-acetylcysteine, which appears to attenuate the toxic effects of the contrast (although the ED indications for this are controversial and not universally accepted). It is important for the EP to recognize patients who are at risk for developing renal injury and limit IV contrast administration for patients with equivocal indications for its use.

97 Answer E. Patients with twisting injuries of the knee often present acutely to the ED. Physical examination findings to assess for ligamentous instability (anterior drawer, varus/valgus stress, Lachman) are often unreliable in the acute setting due to limited range of motion from acute effusion.

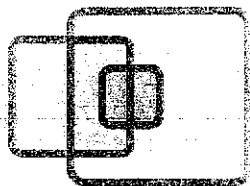
No specific predictions should be made by the EP regarding prognosis for knee injuries. Follow-up examination by an orthopedist with possible MRI should be the standard evaluation for most nontraumatic knee injuries. Distal femur or proximal tibial fractures in young, healthy patients without trauma are extremely rare. Knee dislocation and spontaneous relocation would demonstrate evidence of gross knee instability in all directions.

98 Answer D. The patient has evidence of Ludwig's angina, a cellulitis of the connective tissues of the mouth and neck. The most commonly affected teeth are the molars—usually lower and posterior. Although odontogenic infection is the most common cause, trauma or oral malignancy may also predispose to the condition. Ludwig's angina is usually polymicrobial, and the most common species are *Streptococci*, *Staphylococci*, and *Bacteroides*. Airway obstruction is the number one cause of mortality, which may be as high as 10% even in the presence of adequate therapy. Standard oral endotracheal intubation and cricothyroidotomy may be difficult given the edema, secretions, and friability of tissues. Treatment involves high-dose penicillin, clindamycin, or broader-spectrum agents such as piperacillin-tazobactam or ampicillin-sulbactam. The role of steroids is not clearly defined at this time. Intensive care admission should be initiated and ENT should be consulted to address possible tracheostomy placement.

99 Answer B. The peripheral blood smear demonstrates schistocytes, which, in the setting of renal dysfunction, anemia, and diarrhea indicates the presence of hemolytic uremic syndrome (HUS). The triad of anemia, thrombocytopenia, and renal insufficiency should prompt evaluation for either HUS or thrombotic thrombocytopenic purpura (TTP). Fever and neurologic signs and symptoms are more common in the latter, but the two are thought to

be on the same spectrum of disease. The toxin-forming bacterium *E. coli* O157:H7 is responsible for most epidemic cases of HUS. Treatment is primarily supportive, aimed at preventing complications of severe anemia and thrombocytopenia. Plasma-pheresis is used for cases of idiopathic HUS or TTP. Henoch-Schönlein purpura is a vasculitis heralded by renal dysfunction in the setting of lower extremity palpable purpura, abdominal pain, and arthralgias. Disseminated intravascular coagulation (DIC) is due to distortion of the clotting cascade from severe associated illness. Idiopathic thrombocytopenic purpura causes thrombocytopenia without schistocyte formation. Nephrotic syndrome causes renal dysfunction without hematologic abnormalities. (Figure from Anderson SC, Poulsen KB. *Anderson's atlas of hematology*. Philadelphia: Lippincott Williams & Wilkins; 2003, with permission.)

100 Answer B. The patient has symmetric swelling of his foreskin behind his glans without active retraction indicative of a paraphimosis. This is a urologic emergency that can occur in uncircumcised patients which requires prompt reduction to prevent necrosis of the glans. Reduction is performed by squeezing the glans for several minutes to clear the capillaries of blood and pulling the foreskin over the glans. A dorsal slit procedure may need to be performed if noninvasive reduction is unsuccessful. A *phimosis* refers to inability to retract the foreskin over the glans—it does not require emergent reduction. *Balanitis* refers to bacterial or fungal infection of the glans without concomitant foreskin infection (which would be called *balanoposthitis*). Testicular torsion and scrotal hernia are not often evident on simple inspection and require palpation and ultrasonography to definitively diagnose. (Figure from Fleisher GR, Ludwig S, Baskin MN, eds. *Atlas of pediatric emergency medicine*, 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2004, with permission.)



Test 10

Questions

1 Which of the following is true regarding isopropanol poisoning?

- (A) Blood urea nitrogen (BUN) may be falsely elevated.
- (B) Ketosis without acidosis is the characteristic lab abnormality.
- (C) Elevated anion gap is seen in most patients.
- (D) Ocular accumulation causing blindness is the typical pathophysiologic finding.
- (E) Fomepizole should be administered empirically in patients with high suspicion of isopropanol poisoning.

2 Which of the following studies has the highest sensitivity for traumatic pericardial tamponade?

- (A) Anteroposterior (AP) chest x-ray
- (B) Lateral chest x-ray
- (C) Electrocardiogram (EKG)
- (D) Focused assessment of sonography in trauma (FAST) scan
- (E) Diagnostic peritoneal lavage (DPL)

3 Which of the following is true regarding genital herpes simplex infection?

- (A) The primary attack is usually more severe than recurrent episodes.
- (B) Lesions are almost always painless.
- (C) The Tzanck smear has >90% sensitivity and specificity.
- (D) Vesicles should be unroofed to allow drainage of fluid.
- (E) Antibiotics are indicated during outbreaks to prevent bacterial superinfection.

4 The most common cause of lower gastrointestinal bleeding (LGIB) in children is

- (A) Anal fissure.
- (B) Hemorrhoids.
- (C) Henoch-Schönlein purpura.
- (D) Food allergy.
- (E) Meckel's diverticulum.

5 A 34-year-old man presents after a high-speed motor vehicle crash. Chest x-ray is performed and shown in

Figure 10-1. Which of the following is the most likely diagnosis?

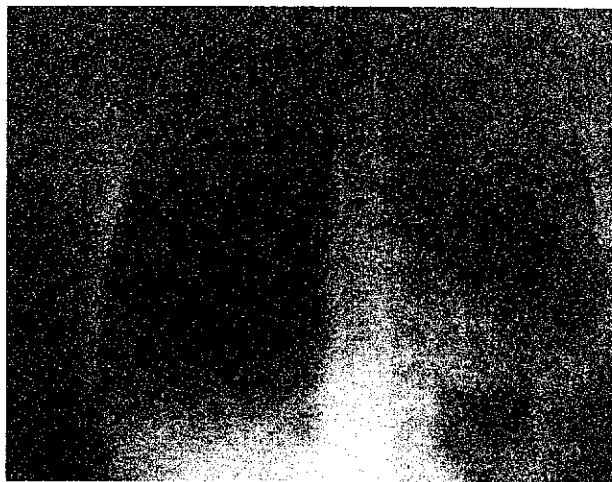


Figure 10-1.

- (A) Pneumothorax
- (B) Small bowel rupture
- (C) Duodenal hematoma
- (D) Diaphragmatic rupture
- (E) Hemothorax

6 A 42-year-old man presents with left foot pain. He states his foot folded underneath him after he jumped from a short ledge during a game with his son. His body weight first landed on his plantar-flexed foot and then the foot folded beneath him. He now has difficulty ambulating. An x-ray is shown in Figure 10-2. Which of the following is true?

- (A) The fracture fragment indicates that the ligaments are intact.
- (B) This is a stable injury.
- (C) Degenerative arthritis is the most common complication.
- (D) Subtle plantar displacement is sometimes the only sign of this injury.
- (E) The posterior tibial artery may be damaged during this injury.



Figure 10-2.

- 77 Which of the following most places women at risk for abruptio placentae?
- Preeclampsia
 - Cigarette smoking
 - Premature rupture of membranes (PROM)
 - Cocaine use
 - Trauma
- 78 Which of the following is true regarding imaging of patients with suspected sinusitis?
- Plain films are more accurate in diagnosing frontal and ethmoid than maxillary sinusitis.
 - Water's view plain film is the most sensitive test for maxillary sinusitis.
 - Computed tomography (CT) scans are able to differentiate between acute bacterial and viral sinusitis.
 - CT scans are both highly sensitive and highly specific in the diagnosis of sinusitis.
 - Most patients with viral upper respiratory infections (URIs) have abnormal CT scan findings.
- 9 An 18-year-old primigravida at 35 weeks' gestation presents with abdominal pain, vaginal discharge and a low-grade fever. She states that she was well until two days ago when, after coughing, she experienced a small stream of fluid running down her leg which she thought was urine. Her temperature is 102°F and her pulse is 108. Her examination reveals a yellowish discharge in the vaginal vault with a tender uterus. The most likely cause of her symptoms is
- Abruptio placentae.
 - Pelvic inflammatory disease.
 - Trichomonas.
 - Pyelonephritis.
 - Chorioamnionitis.
- 10 Which of the following has the greatest immediate effect on preload in the management of acute congestive heart failure (CHF)?
- Morphine
 - Enalaprilat
 - Digoxin
 - Furosemide
 - Nitroglycerin
- 11 Which of the following is true regarding candidiasis?
- Cutaneous candidiasis is the most common manifestation of infection.
 - Candida* is part of the normal oral flora in most humans.
 - Thrush in otherwise healthy newborns is self-limited and does not require treatment.
 - Candida* is the most common cause of jock itch (tinea cruris).
 - Maceration and lichenification with thick scale is the hallmark of cutaneous candidiasis.
- 12 An 85-year-old woman presents from a nursing home with fever and hypotension. According to the paramedic history, she began to have lethargy and refused to get out of bed the day before. There is no reported history of cough, shortness of breath, diarrhea, headache, or rash. Her vital signs are: 102.4°F, 122, 22, 72/44, 95% RA. The patient's physical examination is nonfocal, and routine laboratory work is sent. Which of the following is the most appropriate empiric antibiotic therapy at this time?
- Ampicillin
 - Ampicillin and gentamicin
 - Vancomycin and piperacillin-tazobactam
 - Vancomycin, piperacillin-tazobactam, metronidazole
 - Vancomycin, piperacillin-tazobactam, clindamycin
- 13 Which of the following is true regarding the Ottawa Ankle Rules (OAR)?
- Patients who do not meet the OAR criteria never have an ankle fracture.
 - The OAR should not be applied to intoxicated patients.

- (C) The OAR criteria include a positive "squeeze" test.
 - (D) The OAR can be applied to pediatric patients older than 8 years.
 - (E) The specificity of the OAR is roughly 90%.
- 14** A 47-year-old man with a history of alcoholism presents with a chief complaint of jaundice, right upper quadrant pain, and a low-grade fever. He had his last drink earlier in the day. Which of the following is true?
- (A) His AST and ALT levels will be more than ten times normal.
 - (B) He should be transferred for immediate liver transplantation.
 - (C) The patient's fever suggests an infectious cause of his symptoms is most likely.
 - (D) Reactive leukopenia is the most common cellular laboratory abnormality.
 - (E) Hepatomegaly is the most common physical examination finding.
- 15** Which of the following can be used to treat hypertrophic cardiomyopathy?
- (A) Digitalis
 - (B) Isoproterenol
 - (C) Furosemide
 - (D) Phenylephrine
 - (E) Metoprolol
- 16** Which of the following Salter-Harris fractures carries the poorest prognosis?
- (A) Type I
 - (B) Type II
 - (C) Type III
 - (D) Type IV
 - (E) Type V
- 17** A 60-year-old man presents with acute urinary retention. He has been unable to urinate for the last 10 hours and has extreme discomfort in his lower abdomen. His physical examination is normal except for a distended suprapubic region and nontender prostatic hypertrophy. He appears very uncomfortable. Which of the following is the most appropriate next step in management?
- (A) Magnetic resonance imaging (MRI) of the abdomen
 - (B) CT scan abdomen with and without IV contrast
 - (C) Renal ultrasonography
 - (D) Complete blood count, chemistry panel
 - (E) Foley catheter placement
- 18** A 24-year-old woman presents with a diffuse rash (see Fig. 10-3). She had "sores" of her mouth and

eyes as well as numerous "spots" on her trunk, but now the rash has spread throughout her body. She is uncomfortable and her skin is warm and tender. Pressure applied to skin adjacent to the lesions seems to extend the lesion into the normal appearing skin. In exploring her recent history, which of the following is most likely?



Figure 10-3.

- (A) She recently had a viral upper respiratory infection (URI).
 - (B) She was being treated for a urinary tract infection.
 - (C) She has human immunodeficiency virus (HIV).
 - (D) She was recently diagnosed with leukemia.
 - (E) She has gout.
- 19** A 23-year-old man presents with bilateral lower extremity flaccid paralysis 1 day after being assaulted. An anterior lumbar spinal cord injury is identified. Which of the following is the most appropriate therapy at this time?
- (A) Normal saline hydration
 - (B) Naloxone
 - (C) Methylprednisolone
 - (D) Vancomycin
 - (E) Vasopressin
- 20** Which of the following characteristics are true regarding Kernig's and Brudzinski's signs in the diagnosis of meningitis?
- (A) High sensitivity but low specificity
 - (B) Low sensitivity but high specificity

- (C) High sensitivity and specificity
 (D) Low sensitivity and specificity
 (E) Sensitivity and specificity depend on the prevalence of the disease in the population being studied
- 21 Which of the following spinal injuries is most likely to be stable?
 (A) Flexion teardrop fracture
 (B) Bilateral facet dislocation
 (C) Transverse process fracture
 (D) Hangman's fracture
 (E) Jefferson's fracture
- 22 Which of the following is more characteristic of endocarditis in IV drug users than in nondrug users?
 (A) Higher mortality from *Staphylococcus aureus*
 (B) Audible heart murmur
 (C) Splinter hemorrhages
 (D) Septic pulmonary emboli
 (E) Roth spots
- 23 A 4-year-old boy is brought by his parents because he swallowed some of his grandmother's antihypertensive medicine. He is sleepy, bradycardic, and hypotensive. Which of the following is the most appropriate treatment?
 (A) Atropine
 (B) Glucagon
 (C) Atropine and glucagon
 (D) Atropine, glucagon, and calcium
 (E) Atropine, glucagon, calcium, and high-dose insulin with glucose
- 24 A 72-year-old man develops acute onset of shaking chills and shortness of breath a few days after an upper respiratory infection (URI). His past medical history is significant for diabetes and stable coronary artery disease. Vital signs are 101°F, 115, 24, 144/95, 90% RA. Physical examination reveals a patient with rigors and right lower lobe crackles. Which of the following is the most appropriate next step in management?
 (A) Doxycycline PO and discharge
 (B) Azithromycin PO and discharge
 (C) Ceftriaxone and Azithromycin IV and admit
 (D) Clindamycin IV and admit
 (E) Piperacillin-tazobactam IV and admit
- 25 A 22-year-old woman presents with intermittent fever and chills for 2 weeks. She has no past medical history, but reports using intravenous heroin several times a week. Physical examination reveals a febrile, ill-appearing woman with a heart murmur. Blood cultures are most likely to show which of the following etiologic organisms?
 (A) *Staphylococcus aureus*
 (B) *Streptococcus pneumoniae*
 (C) *Streptococcus viridans*
 (D) *Pseudomonas aeruginosa*
 (E) *Candida albicans*
- 26 Which of the following is true regarding creatine kinase-myocardial bound (CK-MB) in acute myocardial infarction (MI)?
 (A) Starts elevating 1 hour after MI
 (B) Peaks at 36 hours after MI
 (C) Returns to baseline within 72 hours
 (D) Sensitivity at 3 hours after MI is 95%
 (E) Specificity at 3 hours after MI is 95%
- 27 A 42-year-old woman who is a self-described "seafood fanatic" presents with a chief complaint of an "allergic reaction." Thirty minutes after eating tuna at a local restaurant she developed a severe headache, palpitations, nausea, abdominal cramping and remarkable facial flushing. She has eaten fish for her entire life without incident. Which of the following is true?
 (A) She should be given subcutaneous epinephrine and parenteral corticosteroids.
 (B) Perioral paresthesias are typically a classic feature of this illness.
 (C) Upon discharge, the patient should be advised to avoid all seafood products in the future.
 (D) The patient should expect symptoms to resolve slowly over the course of 1 week.
 (E) The symptoms are due to excessive histamine levels in the fish.
- 28 A 22-year-old man presents with a swollen area on his scrotum shown in Figure 10-4. The area is firm and

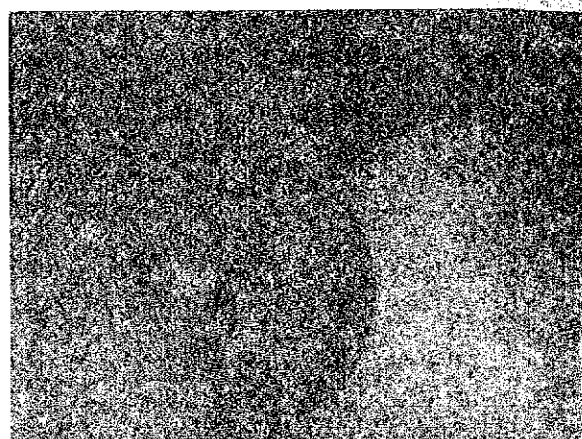


Figure 10-4.

nontender to palpation and does not transilluminate. Which of the following is the most appropriate next step in management?

- (A) Emergent surgery
- (B) Azithromycin PO
- (C) Outpatient urology referral
- (D) Scrotal elevation
- (E) Corticosteroids

- 29** A 64-year-old woman is brought in by emergency services (EMS) with a chief complaint of "anaphylaxis." The patient has a known peanut allergy and inadvertently ingested some ground nuts in a dish prepared by a friend. She has a known history of coronary artery disease and is on metoprolol. Her symptoms do not respond to epinephrine, corticosteroids, or antihistamines. She is intubated but remains hypotensive and unstable. Which of the following may be of benefit?

- (A) Calcium chloride
- (B) Atropine
- (C) Glucagon
- (D) Nebulized albuterol
- (E) Terbutaline

- 30** Which of the following best supports a diagnosis of pertussis in a child with cough?

- (A) Pneumonia on chest x-ray
- (B) Eosinophilia
- (C) Prolonged course
- (D) Age older than 7 years
- (E) Fever $>102^{\circ}\text{F}$

- 31** Which of the following is the recommended treatment in a patient with group A β -hemolytic streptococcal (GAS) pharyngitis and a penicillin allergy?

- (A) Tetracycline
- (B) Trimethoprim-sulfamethoxazole
- (C) Levofloxacin
- (D) Erythromycin
- (E) Chloramphenicol

- 32** The most common cause of death in patients with toxic epidermal necrolysis (TEN) is

- (A) Electrolyte abnormalities
- (B) Respiratory failure
- (C) Sepsis
- (D) Dehydration
- (E) Ventricular dysrhythmias

- 33** Which of the following signs and symptoms may accompany a cluster headache?

- (A) Ptosis
- (B) Lacrimation

- (C) Miosis
- (D) Nasal congestion
- (E) All of the above

- 34** A 34-year-old man presents with acute onset of penile pain and swelling which occurred during sexual intercourse. His penis is shown in Figure 10-5. Which of the following is the most appropriate definitive management?

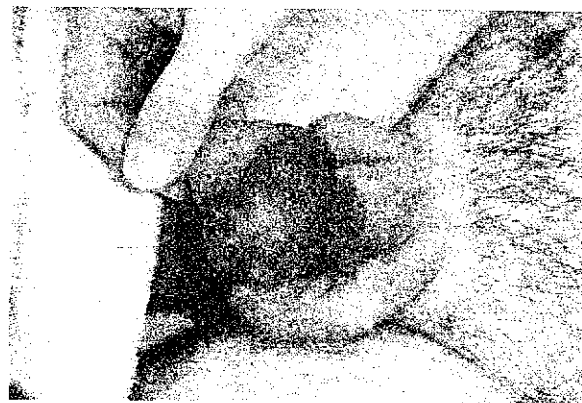


Figure 10-5.

- (A) Observation
- (B) Foley catheterization
- (C) Surgical repair
- (D) Penile splinting
- (E) Penile pressure dressing

- 35** A 45-year-old woman with a history of hypertension presents with tongue swelling, as shown in Figure 10-6. She was recently started on a new

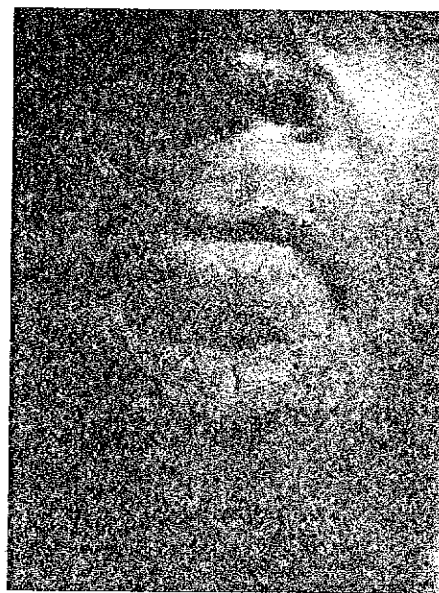


Figure 10-6.

blood pressure medication. Despite therapy with steroids, antihistamines, and epinephrine, she is still worsening. In addition to measures for airway control, which of the following is most likely to be helpful in this patient?

- (A) Verapamil
- (B) Metoprolol
- (C) Fresh frozen plasma
- (D) Danazol
- (E) Aldosterone

36 Which of the following is true about *Salmonella* infections?

- (A) Seventy-five percent of household pets, such as dogs and cats, excrete *Salmonella*.
- (B) *Salmonella* requires only a very small inoculum to result in symptomatic infection.
- (C) Nearly half the number of patients hospitalized with salmonellosis are immunocompromised.
- (D) Treatment with ciprofloxacin is recommended in all cases of documented salmonellosis.
- (E) All of the above.

37 A 22-year-old man presents with rash, lightheadedness, and generalized malaise. He denies fever or pruritus. A few hours before presentation, he was seen in another emergency department (ED) and received treatment for syphilis. He denies any medication allergies. His vital signs are 99.2, 94, 16, 134/65, 99% RA. His physical examination demonstrates a normal uvula, no pulmonary wheezes, and a faint macular rash on his trunk and abdomen, which he states was there before he received the treatment today. Which of the following is the most appropriate next step in management?

- (A) Immediate endotracheal intubation
- (B) IM epinephrine
- (C) Diphenhydramine and famotidine
- (D) Prednisone
- (E) Acetaminophen and observation

38 Which of the following is the most common admission diagnosis in patients older than 65 years?

- (A) Pericarditis
- (B) Myocarditis
- (C) Hypertensive emergency
- (D) CHF
- (E) ST-segment elevation myocardial infarction

39 A 40-year-old man presents with delirium, polyuria, and a serum calcium level of 15 mg per dL. Which of the following is true?

- (A) Nifedipine is the agent of choice for initial treatment.

- (B) Thiazide diuretics are more helpful than loop diuretics in promoting urine calcium excretion.
- (C) Calcitonin can be used as monotherapy in the treatment of hypercalcemia.
- (D) Sodium bicarbonate infusion will increase the amount of ionized calcium.
- (E) Glucocorticoids may be helpful if the patient has an underlying hematologic malignancy or granulomatous disease.

40 The development of lethargy, headache, and vomiting in a pediatric patient being treated for diabetic ketoacidosis (DKA) suggests the presence of:

- (A) Meningitis.
- (B) Cerebral edema.
- (C) Worsening acidosis.
- (D) Central pontine myelinolysis.
- (E) Hyponatremia.

41 A 5-year-old boy presents with right hip pain. There is no history of trauma. Which of the following is the most likely cause?

- (A) Femoral neck fracture
- (B) Osteogenesis imperfecta
- (C) Transient synovitis
- (D) Slipped capital femoral epiphysis (SCFE)
- (E) Legg-Calve-Perthes disease

42 Which of the following is the most common sign or symptom in patients with normal pressure hydrocephalus (NPH)?

- (A) Ataxia
- (B) Dementia
- (C) Papilledema
- (D) Urinary incontinence
- (E) Headache

43 A 24-year-old married woman presents to the ED with the rash shown in Fig. 10-7. She notes that while

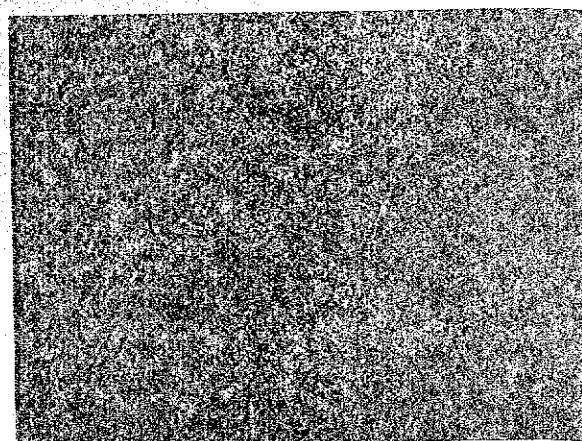


Figure 10-7.

she has been well, she had a recent "cold sore" that resolved on its own. She now complains of general malaise, mild arthralgias, and a rash. The rash is symmetric and is spread over her extremities as well as her palms and soles. Which of the following is true about her illness?

- (A) Mucosal involvement is common.
- (B) A positive Nikolsky's sign will be present.
- (C) Intravenous immunoglobulin is the only effective treatment.
- (D) The lesions are typically not pruritic.
- (E) All of the above.

44 Which of the following is usually the earliest symptom to occur in patients with aortic stenosis (AS)?

- (A) Dyspnea on exertion
- (B) Angina
- (C) Syncope
- (D) Orthopnea
- (E) Paroxysmal nocturnal dyspnea

45 A 35-year-old woman presents with severe weakness, lightheadedness, and chest pain. Her blood pressure is 70/40 and her pulses are weak. The EKG is shown in Figure 10-8. Which of the following is the most important next step in management?

- (A) Adenosine 6 mg IV
- (B) Diltiazem 20 mg IV
- (C) Amiodarone 300 mg IV
- (D) Synchronized Cardioversion at 50 J
- (E) Defibrillation at 200 J

46 Which of the following is the most common cause of Ludwig's angina?

- (A) Preexisting dental disease
- (B) Diabetes mellitus
- (C) Mandible fractures
- (D) Tongue piercing
- (E) Oral malignancy

47 A 42-year-old man presents with a swollen, erythematous, and tender left knee. He is in a long-term monogamous relationship. A concomitant history of recurrent renal stones in this man suggests a diagnosis of:

- (A) Reiter's syndrome.
- (B) Systemic lupus erythematosus.
- (C) Rheumatoid arthritis.
- (D) Gout.
- (E) Nongonococcal septic arthritis.

48 A 23-year-old man presents after a stab wound to his right lumbar paraspinal area. Which of the following is the most likely neurologic deficit?

- (A) Left leg weakness and left-sided loss of pain sensation
- (B) Left leg weakness and right-sided loss of pain sensation
- (C) Right leg weakness and left-sided loss of pain sensation
- (D) Right leg weakness and right-sided loss of pain sensation

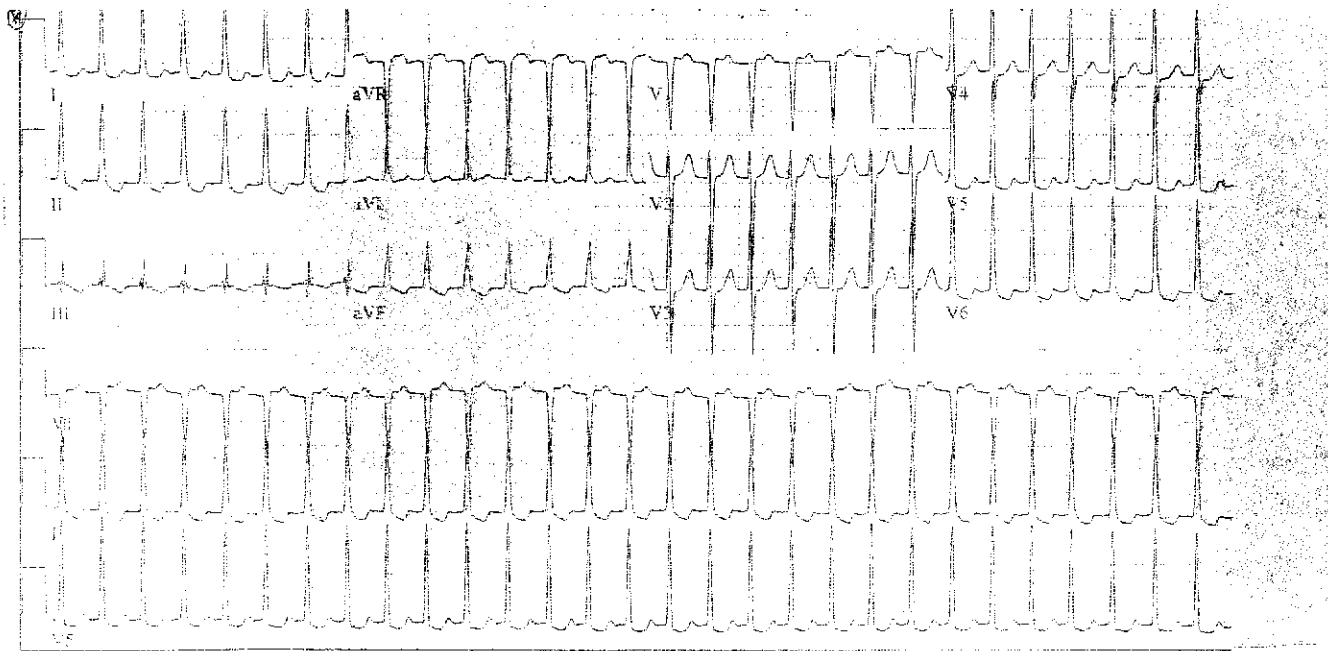


Figure 10-8.

- (E) Right arm and leg weakness and right-sided loss of pain sensation
- 49** Which of the following is true about vertigo?
- (A) Purely vertical nystagmus is almost always consistent with peripheral vertigo.
 - (B) Nystagmus in central vertigo may change direction.
 - (C) Patients with central and peripheral causes of vertigo generally have equal difficulty with gait (ataxia).
 - (D) Nausea and vomiting are classically more prominent in central vertigo.
 - (E) Nystagmus in central vertigo is inhibited with fixation.
- 50** Which of the following is true regarding retinal detachment?
- (A) It is usually painful.
 - (B) Presbyopia is a risk factor.
 - (C) Visual acuity may be normal.
 - (D) The elevated retina often appears dark red.
 - (E) Ophthalmologic follow-up is indicated in 1 week.
- 51** Which of the following is true regarding urinary tract infections in pregnancy?
- (A) Pyelonephritis in pregnancy is almost always left sided.
 - (B) Asymptomatic bacteriuria is less common in pregnant women than in nonpregnant women.
 - (C) All pregnant women with asymptomatic bacteriuria should receive antimicrobial treatment.
 - (D) *Candida* spp. is a common cause of urinary tract infections in pregnant women.
 - (E) All of the above.
- 52** The Judet view is most helpful to image which portion of the pelvis?
- (A) Inlet
 - (B) Outlet
 - (C) Acetabulum
 - (D) Iliac wing
 - (E) Pubic symphysis
- 53** Which of the following is a biochemical effect of tricyclic antidepressants?
- (A) α -1 Agonist
 - (B) Dopamine reuptake inhibitor
 - (C) Muscarinic agonist
 - (D) γ -Aminobutyric acid (GABA) agonist
 - (E) Antihistamine
- 54** A 34-year-old man presents with altered mental status after being assaulted. Otic examination is shown in Figure 10-9. Which of the following is the most likely diagnosis?

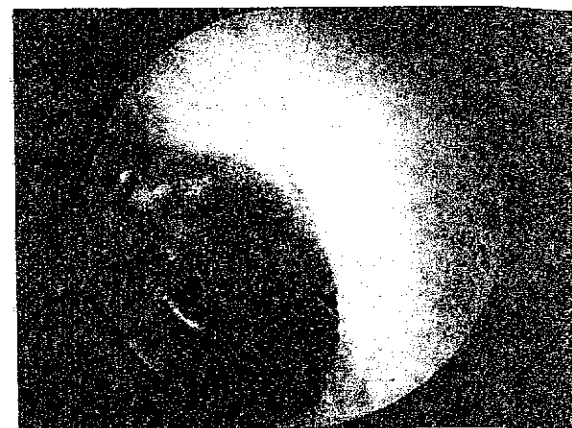


Figure 10-9.

- (A) Otitis media
- (B) Anterior fossa skull fracture
- (C) Middle fossa skull fracture
- (D) Posterior fossa skull fracture
- (E) Nasal fracture

- (B) A vesicular rash over the ear indicates a better prognosis.
- (C) The patient should be given a prescription for prednisone and acyclovir.
- (D) The patient's diabetes and hypertension do not affect the outcome of his illness.
- (E) After recovery, he has a 50% chance of having another episode in his lifetime.

58 Which of the following is the most common symptom of rheumatic fever?

- (A) Chorea
- (B) Carditis
- (C) Erythema marginatum
- (D) Migratory polyarthritis
- (E) Fever

59 Which of the following test results is most concerning in a patient with an acute asthma exacerbation?

- (A) Leukocytosis of 14,000
- (B) K^+ 3.4
- (C) Hyperlactatemia
- (D) Eosinophilia
- (E) Arterial blood gas (ABG) with pH 7.35, PO_2 60, P_{CO_2} 45

60 Which of the following heart valves does infective endocarditis most commonly involve in the patient with rheumatic heart disease?

- (A) Tricuspid
- (B) Pulmonic
- (C) Mitral
- (D) Aortic
- (E) Affects all valves equally

61 Which of the following is true regarding major depression?

- (A) Visual hallucinations have high specificity for the diagnosis.
- (B) Paranoid delusions have high sensitivity for the diagnosis.
- (C) Either depressed mood or anhedonia is required for the diagnosis.
- (D) The prevalence of major depression is the same as bipolar disorder.
- (E) In the elderly, depression is easily distinguished from dementia on clinical grounds.

62 Regarding the image (see Fig. 10-10):

- (A) Letter B refers to Boehler's angle and the normal measurement is between 20 and 40 degrees.
- (B) Letter A refers to Boehler's angle and the normal measurement is <20 degrees.

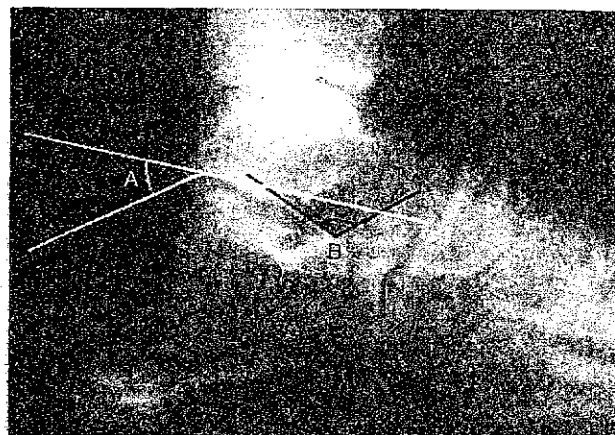


Figure 10-10.

- (C) Neither A nor B are a reflection of Boehler's angle.
- (D) Letter A is Boehler's angle and is used to determine the integrity of the calcaneus.
- (E) Boehler's angle is calculated by subtracting angle A from angle B and should be approximately 40 degrees.

63 A 27-year-old man presents with a rash (see Fig. 10-11). The patient states that his wife first noticed a single spot on his back approximately 10 days ago. He denies fever or pain and complains only of mild pruritus. Over the last few days, many new "spots" have cropped up on his back and trunk. On examination, you note that

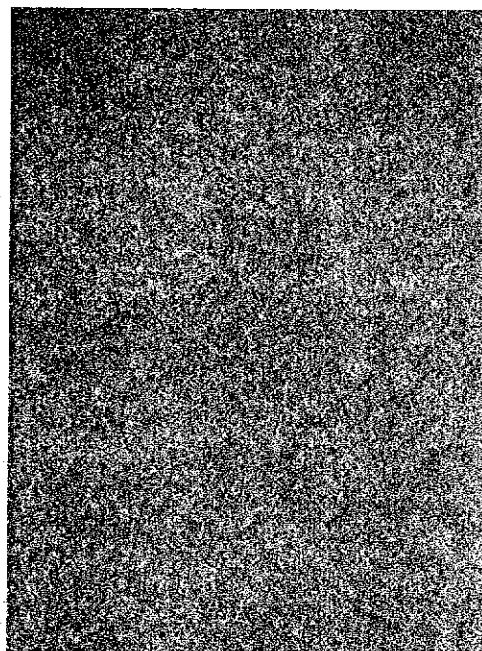


Figure 10-11. (See color insert.)

the lesions have a fine scale around the border and seem to be arranged along the skin lines of the back. Which of the following is the most likely diagnosis?

- (A) Secondary syphilis
- (B) Pityriasis rosea
- (C) Molluscum contagiosum
- (D) Tinea corporis
- (E) Atopic dermatitis

64 Which of the following is the most common symptom in patients diagnosed with an abdominal aortic aneurysm (AAA)?

- (A) Nausea
- (B) Abdominal distention
- (C) Constipation
- (D) Urinary retention
- (E) Asymptomatic

65 Which of the following parasites is associated with seizures?

- (A) *Trypanosoma cruzi*
- (B) *Taenia solium*
- (C) *Taenia saginata*
- (D) *Trichuris trichiura*
- (E) *Leishmania braziliensis*

66 Most radioisotopes decay by:

- (A) α Particles.
- (B) β Particles.
- (C) γ Rays.
- (D) Electron capture.
- (E) Microwaves.

67 Which of the following is the most common finding in propranolol overdoses in adults?

- (A) Ventricular tachycardia
- (B) Hypoglycemia
- (C) Hyperkalemia
- (D) Seizure
- (E) Renal failure

68 The earliest indicator of acute radiation syndrome is

- (A) Thrombocytopenia.
- (B) Eosinophilia.
- (C) Decrease in absolute lymphocyte count.
- (D) Aplastic anemia.
- (E) Increase in the number of atypical lymphocytes.

69 A 35-year-old man presents after a motor vehicle collision with hypotension, tachycardia and altered mental status. He is determined to be in hemorrhagic

shock. Which of the following is the most appropriate blood product to administer immediately?

- (A) Type O negative crossmatched blood
- (B) Type O negative uncrossmatched blood
- (C) Type O positive crossmatched blood
- (D) Type O positive uncrossmatched blood
- (E) Fresh frozen plasma

70 An 18-month-old previously healthy child is brought in by his mother with bilateral oral commissure burns after biting an extension cord. He cried immediately after the injury, did not lose consciousness, and he has been acting normally since the injury. On examination, you note a 5-mm burn to both of the patient's oral commissures. Which of the following is true?

- (A) He should be transferred to a burn center for immediate debridement and reconstructive repair.
- (B) Delayed labial artery bleeding can usually be managed with direct pressure.
- (C) All patients with bilateral oral commissure burns should have a CT scan of the face to search for deep tissue injury.
- (D) He should be admitted for 24 hours of cardiac monitoring.
- (E) Serum creatine kinase and troponin levels should be measured.

71 A first-time mother brings in her 4-day-old boy to the ED with a chief complaint of abdominal pain and sudden yellowish-green vomiting. She notes that he had been "fussy" all day but became ill only a few hours earlier. On examination, he appears ill and has a mildly distended abdomen. An abdominal film is shown in Figure 10-12. Which of the following is the next best step in management?

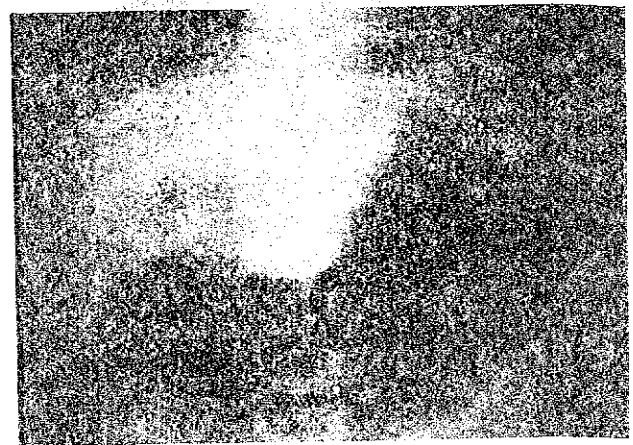


Figure 10-12.

- (A) Barium enema
 - (B) Emergent surgical consultation
 - (C) Broad spectrum antibiotics for presumed necrotizing enterocolitis
 - (D) Obtain an ultrasound to rule out pyloric stenosis
 - (E) Recommend smaller, thickened feedings, frequent burping and discharge home
- 72** Which of the following is true regarding thromboembolic disease in pregnancy?
- (A) Ventilation-perfusion (V/Q) scans expose the fetus to less radiation than helical CT chest scans in ruling out pulmonary embolism (PE).
 - (B) Warfarin is only contraindicated during fetal organogenesis.
 - (C) Thromboembolic disease is the leading cause of death in pregnancy.
 - (D) The risk of deep venous thrombosis is highest in the third trimester.
 - (E) All of the above.
- 73** A 44-year-old man presents with chest pain after a motor vehicle collision. He receives an upright chest x-ray which is shown in Figure 10-13. Which of the following is the most likely diagnosis?



Figure 10-13.

- (A) Pneumothorax
 - (B) Hemothorax
 - (C) Pulmonary contusion
 - (D) Traumatic aortic rupture
 - (E) Cardiac contusion
- 74** Which of the following is true regarding osmotic demyelination syndrome (or ODS, also known as central pontine myelinolysis)?

- (A) Partial recovery occurs after induction of hyponatremia through infusion of 5% Dextrose in water.
- (B) It is more common after correction of acute rather than chronic hyponatremia.
- (C) It is more common in diabetic patients with pseudohyponatremia due to hyperglycemia.
- (D) Most common initial symptom is burning paresthesias in the hands and feet.
- (E) Patients do not typically present until a few days after treatment of hyponatremia.

- 75** A 56-year-old man presents after a high-speed motor vehicle collision. He complains of severe chest pain and chest x-ray demonstrates a widened mediastinum. Chest CT scan shows a traumatic aortic injury (TAI). The patient's heart rate is 95 and blood pressure is 175/77. Operative repair is scheduled in 30 minutes. Which of the following is the most appropriate therapy at this time?
- (A) No therapy, observe for deterioration
 - (B) Clonidine
 - (C) Hydralazine
 - (D) Labetalol
 - (E) Enalaprilat

- 76** A 34-year-old man with a history of HIV presents with headache. Contrast CT scan of the brain is shown in Figure 10-14. Which of the following is the most appropriate therapy?

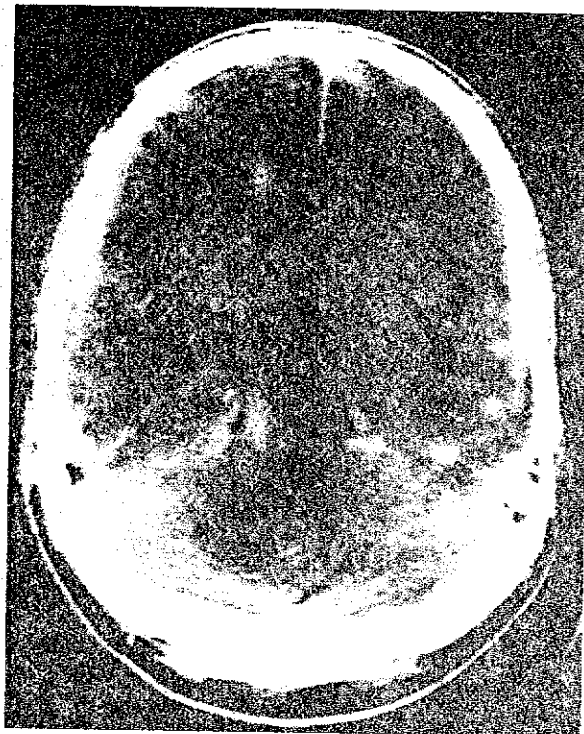


Figure 10-14.

- (A) Surgical excision
(B) Mebendazole
(C) Sulfadiazine and pyrimethamine
(D) Methylprednisolone
(E) Clindamycin
- 77** The preferred method of hand splinting is
(A) The position of greatest comfort for the patient.
(B) Wrist extended to 30 degrees, metacarpophalangeals (MCPs) in full extension, intraphalangeal (IP) joints flexed to 60 degrees.
(C) Wrist neutral, MCPs flexed to 60 degrees, IP joints free.
(D) Wrist extended to 30 degrees, MCPs flexed to 90 degrees, IP joints extended.
(E) Wrist extended to 30 degrees, MCPs flexed to 30 degrees, IP joints flexed to 30 degrees.
- 78** Which of the following is adequately absorbed by activated charcoal?
(A) Lithium
(B) Ethanol
(C) Iron
(D) Toluene
(E) Acetaminophen
- 79** A 24-year-old man ingests liquid drain cleaner and immediately presents to the ED. Which of the following is the most appropriate treatment?
(A) Ingestion of a small cup of water
(B) Calcium gluconate
(C) Dexamethasone
(D) Ampicillin
(E) Neutralization therapy with hydrochloric acid
- 80** Which of the following is the most common cause of acute food poisoning in the U.S.?
(A) *Clostridium perfringens*
(B) *S. aureus*
(C) *Escherichia coli*
(D) *Bacillus cereus*
(E) *Vibrio parahaemolyticus*
- 81** The synovial white blood cell (WBC) count in cases of septic arthritis usually exceeds at least:
(A) 250 per mm^3 .
(B) 1,000 per mm^3 .
(C) 25,000 per mm^3 .
(D) 50,000 per mm^3 .
(E) 100,000 per mm^3 .
- 82** A 14-year-old boy presents with intermittent bilateral hip pain for several weeks. Physical examination demonstrates decreased internal rotation of both hips. Radiographs show slippage of the femoral epiphysis. Which of the following is the most common associated condition?
(A) Hyperthyroidism
(B) Diabetes mellitus
(C) Obesity
(D) Renal failure
(E) Juvenile rheumatoid arthritis
- 83** Which of the following is the most common metabolic abnormality causing adynamic ileus?
(A) Lactic acidosis
(B) Hypokalemia
(C) Hypomagnesemia
(D) Hypercalcemia
(E) Uremia
- 84** Patients with which of the following are most likely to develop superimposed septic arthritis:
(A) Osteoarthritis
(B) Rheumatoid arthritis
(C) Reiter's syndrome
(D) Systemic lupus erythematosus
(E) Gout
- 85** Which of the following is true regarding troponin I in acute MI?
(A) Starts elevating 12 hours after MI
(B) Peaks at 36 hours after MI
(C) Returns to baseline within 72 hours
(D) Sensitivity at 6 hours after MI is 95%
(E) Specificity at 6 hours after MI is 95%
- 86** Examination of which of the following is part of the primary survey in trauma evaluation?
(A) Heart
(B) Lungs
(C) Abdomen
(D) Ears
(E) Nose
- 87** A 53-year-old woman presents 3 days after extraction of a premolar tooth with exquisite pain and tenderness in the area unrelieved by ibuprofen. Halitosis is present. Which of the following is true regarding this patient?
(A) The patient is likely exhibiting drug-seeking behavior.
(B) Irrigation and packing are generally of no benefit.
(C) Pathophysiology involves premature loss of clot from the socket.

- (D) Treatment involves inducing mild bleeding to form a clot.
- (E) Antibiotics and nonsteroidal anti-inflammatory drugs (NSAIDs) play no role in management.
- 88** Which of the following is an indication for antibiotic prophylaxis in patients with prosthetic heart valves?
- (A) Endoscopy
- (B) Intrauterine device (IUD) placement
- (C) Cystoscopy
- (D) Urethral catheterization
- (E) Tympanostomy tube insertion
- 89** Anal fissures are almost always located:
- (A) Anterior midline.
- (B) Posterior midline.
- (C) Right lateral.
- (D) Left lateral.
- (E) Eccentrically.
- 90** Which of the following is the most common lead point in cases of pediatric intussusception?
- (A) Meckel's diverticulum
- (B) Lymphoma
- (C) Intestinal polyp
- (D) Mucosal hemorrhage in Henoch-Schönlein purpura
- (E) Peyer's patches
- 91** A father brings in his 8-year-old daughter with a chief complaint of a facial rash and rash on her arms (see Fig. 10-15). The rash seems to spare the nasolabial fold and perioral area. Which of the following is the cause of this patient's illness?

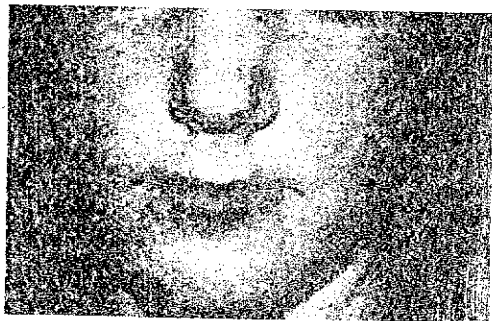


Figure 10-15.

- (A) Rubella
- (B) Human herpesvirus 6
- (C) Parvovirus B19
- (D) Measles virus
- (E) Group A streptococci

- 92** Which of the following is the strongest risk factor for development of right-sided endocarditis?
- (A) Rheumatic heart disease
- (B) Intravenous drug use
- (C) Papillary muscle rupture
- (D) Coronary artery disease
- (E) Systemic lupus erythematosus

- 93** A healthy 23-year-old woman presents with acute bilateral facial weakness. She complains that she "can't taste anything" and that sounds are abnormally loud. She denies any unusual travel and notes only her usual summer camping trip. Which of the following is the most likely cause of her symptoms?
- (A) Infectious mononucleosis
- (B) Miller-Fisher variant Guillain-Barré syndrome (GBS)
- (C) Neurosyphilis
- (D) Lymphoma
- (E) Lyme disease

- 94** The most common ultrasonographic finding in women with ovarian torsion is
- (A) Intraovarian hemorrhage.
- (B) Ovarian enlargement.
- (C) Lack of blood flow through color Doppler imaging.
- (D) Pelvic-free fluid.
- (E) All of the above are common findings.

- 95** Which of the following is true regarding exacerbations and complications of inflammatory bowel disease (IBD)?
- (A) Patients with mild to moderate exacerbations can be sent home with a resumption of therapy or with outpatient corticosteroids.
- (B) Bowel rest has not been shown to be useful in patients with flares of IBD.
- (C) Fistulae are initially treated medically.
- (D) Initial treatment for toxic megacolon includes fluids, antibiotics and corticosteroids.
- (E) All of the above.

- 96** A 44-year-old woman with a history of end-stage renal disease on peritoneal dialysis presents with abdominal pain. You suspect peritonitis as a cause of her pain. Which of the following is the most likely etiologic agent?

- (A) *Staphylococcus* species
- (B) *Streptococcus* species
- (C) *E. coli*
- (D) *Klebsiella*
- (E) *Pseudomonas*

97 Posterior hip dislocations:

- (A) Are less common than anterior hip dislocations.
- (B) Most commonly result in compression of the femoral nerve.
- (C) Are more commonly associated with fractures of the femoral head than anterior dislocations.
- (D) Are associated with an inability to see the lesser trochanter on an anterior-posterior view.
- (E) Cause the patient to have an externally rotated, abducted and shortened leg.

98 A 65-year-old woman presents with right eye pain, irritation, foreign body sensation, and tearing. Skin lesions are seen on the right side of the forehead and the conjunctivae are injected. Slit lamp examination reveals pseudodendrites. Which of the following is true regarding this condition?

- (A) Corneal hypoesthesia, although rare, is usually permanent.
- (B) True dendrites are more commonly seen than pseudodendrites.
- (C) Cranial nerve VII is most commonly involved.
- (D) Anterior uveal involvement is dependent upon severity of corneal disease.
- (E) Systemic antivirals are more effective than topical antivirals.

99 A 67-year-old woman with a history of hypertension and diabetes presents to the ED with a complaint of double vision. On examination you find that she has mild left-sided ptosis and the inability to move her left eye superiorly and medially. The remainder of her eye movements and her pupils are normal. A noncontrast CT scan of the brain you ordered is normal. Which of the following is the next step?

- (A) Cerebral angiogram
- (B) Lumbar puncture (LP)
- (C) MRI/MRA of the brain with contrast
- (D) Administer oral aspirin and admit with a diagnosis of "stroke"
- (E) Discharge with referral to an ophthalmologist

100 Which of the following is the most common organism isolated in spontaneous bacterial peritonitis (SBP)?

- (A) *E. coli*
- (B) *S. aureus*
- (C) *S. pneumoniae*
- (D) *Klebsiella pneumoniae*
- (E) Anaerobic species

Answers and Explanations

- 1 Answer B. Most ingested isopropanol is converted to acetone by hepatic alcohol dehydrogenase. Acetone is a ketone body, but is not acidic or charged, and does not contribute to the anion gap. Ketosis without acidosis is the characteristic finding in patients with isopropanol poisoning. Serum creatinine, not blood urea nitrogen (BUN), may be falsely elevated because of laboratory interference by acetone. Choice D is seen with methanol poisoning. Fomepizole is not indicated, as the metabolites of isopropanol, like the parent compound, cause generalized central nervous system (CNS) depression without other major organ system effects. Dialysis may be indicated to treat extremely severe poisoning.
- 2 Answer D. Pericardial tamponade usually results from a penetrating thoracic mechanism causing cardiac or mediastinal injury and accumulation of blood into the pericardium. Pericardial effusion and tamponade are readily seen on the subxiphoid and parasternal views of the FAST scan. Chest x-ray may show a large, water-bottle heart if the effusion is large enough, but tamponade physiology can occur with small, rapidly accumulating effusions which may be invisible on plain radiography. The EKG finding of electrical alternans due to swinging of the heart throughout the cardiac cycle is highly specific for pericardial effusion, but occurs in less than one third of cases. DPL is highly sensitive for intraperitoneal injury but has no utility in screening for pericardial effusion.
- 3 Answer A. Herpes simplex virus (HSV) type-2 causes most genital herpes infections. Primary HSV infection is almost always more severe than recurrences. Outbreaks can occur with any systemic or local stress. The lesions are usually extremely painful and irritating and should never be drained or unroofed as this will inoculate other sites. The sensitivity and specificity of the Tzanck smear are both <80% and viral culture is the gold standard for diagnosis. Antibiotics should not be used in the absence of clear signs of bacterial superinfection. Treatment of HSV outbreaks is with acyclovir, famciclovir, or valacyclovir. Continuous treatment may be necessary to prevent outbreaks in susceptible individuals.
- 4 Answer A. Anal fissures are the most commonly encountered anorectal problem in children and they are the most common cause of LGIB in this population, particularly in the first 2 years of life. Meckel's diverticulum is the most common cause of substantial gastrointestinal (GI) bleeding in this population.
- 5 Answer D. The chest x-ray demonstrates presence of the gastric bubble inside the thoracic cavity, indicating a large diaphragmatic rupture from blunt trauma. The left diaphragm is much more likely than the right to rupture due to protection on the right from the liver. Management involves nasogastric decompression and surgical repair. Patients with penetrating thoracoabdominal trauma may have delayed abdominal herniation into the thorax as far out as decades after the initial injury. Right-sided diaphragmatic injuries are less likely to have abdominal herniation into the thorax, also because of the presence of the liver. Diaphragmatic injuries may be very subtle and diagnosed only on direct visualization with laparoscopy or thoracoscopy. DPL, FAST, and CT scan all lack sufficient sensitivity for ruling out the diagnosis. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:654.)
- 6 Answer C. The image reveals a Lisfranc fracture-dislocation. Lisfranc injuries are uncommon injuries most often resulting from high-energy trauma such as motor vehicle accidents. They may also occur because of axial loading on a foot in extreme plantarflexion. Any displacement indicates inherent instability and patients develop a high rate of degenerative arthritis, even in the setting of operative repair. Owing to the low incidence of Lisfranc injuries as well as the significant trauma that is often required to produce such an injury, Lisfranc injuries are often overlooked. Furthermore, radiographic evaluation can produce subtle findings. Dorsal displacement of the metatarsals on a lateral foot radiograph is one such finding and indicates ligamentous disruption. Plantar displacement does not occur because of the strength of the plantar fascia. Most commonly however, radiographs will reveal a misalignment of the second metatarsal and the medial border of the middle cuneiform. In addition, the medial border of the fourth metatarsal should be aligned with the medial border of the cuboid on an oblique view. Any displacement indicates a Lisfranc injury. Trauma to the dorsalis pedis artery may occur with Lisfranc injuries as the dorsalis pedis descends between the

first and second metatarsals to form the plantar arch. (Figure reprinted with permission from Harris JH. *The radiology of emergency medicine*, 4th ed. Lippincott Williams & Wilkins; 1999:885.)

- 7 Answer A. Increasing maternal age, cigarette smoking, cocaine use, twin or multiple gestation, preexisting or pregnancy induced hypertension (preeclampsia), trauma, chorioamnionitis, oligohydramnios as well as thrombophilias all place women at risk for abruptio placentae. Of these, preeclampsia is the most significant risk factor.
- 8 Answer E. Sinus imaging has very little role in the ED except in the evaluation of patients with suspected complications of sinusitis (e.g., orbital cellulitis, cavernous sinus thrombosis). However, in the modern era it is clear that plain films have such a low sensitivity for sinus disease that they are virtually never requested. When plain films are used, they are best used for the diagnosis of maxillary sinusitis as their sensitivity drops when used to image other sinuses. CT scans are currently the most useful imaging modality in the evaluation of sinusitis. Although they are highly sensitive tests, they have a poor specificity (high false positive rate). Several studies have demonstrated that asymptomatic patients with uncomplicated viral upper respiratory infection (URIs) have abnormalities of one or both maxillary sinuses on CT scan. The same is true for asymptomatic patients with seasonal allergies. Therefore, CT scans should never stand alone in the diagnosis of sinusitis. A diagnosis of sinusitis should be supported with clinical findings of facial or dental pain, headache, and purulent nasal discharge, often preceded by a viral URI.
- 9 Answer E. This patient experienced preterm premature rupture of membranes (PPROM) 2 days before presentation, which dramatically increased her risk for developing chorioamnionitis. Chorioamnionitis is an intra-amniotic infection that is most commonly due to vaginal flora that have gained entry to the amniotic cavity. Risk factors include young age, low socioeconomic status, nulliparity, extended duration of labor and ruptured membranes, multiple vaginal examinations, and preexisting infections of the lower genital tract. The typical causative organisms are group B streptococci and *E. coli* and the most widely used antibiotic regimen is a combination of ampicillin and gentamicin. Ampicillin may be replaced with vancomycin, erythromycin, or clindamycin in penicillin-allergic patients.
- 10 Answer E. Nitroglycerin directly dilates the great veins and reduces left ventricular preload. Afterload

reduction by nitrates is much less prominent. Morphine and loop diuretics such as furosemide are also used for preload reduction but have a smaller effect than nitrates. While morphine has been used for years as part of the standard treatment of CHF for preload reduction, there have been few rigorously conducted randomized trials confirming its benefit. Morphine most likely exerts its preload reducing effect by reducing anxiety and subsequent catecholamine production and release. Loop diuretics cause preload reduction by inhibiting renal sodium reabsorption thereby increasing urine volume and decreasing plasma volume. However, the elevated afterload in patients with CHF reduces renal perfusion and thereby limits the effectiveness of loop diuretics. Afterload reduction is most commonly achieved through the use of ACE inhibitors such as enalaprilat, although nitroprusside and hydralazine may also be used to achieve this effect. Digoxin causes an increase in cardiac contractility without major changes on preload or afterload, and has no role in the management of acute CHF. In fact, prior digoxin use has been shown to correlate to increased in-hospital mortality amongst patients admitted with CHF.

- 11 Answer B. Oral candidiasis is the most common form of candidal infection and *Candida* species colonize the oropharynx of 80% of healthy infants by 3 to 4 weeks of age. Oral candidiasis is also an AIDS-defining illness. Because *Candida* spp. are part of the normal flora of some many people, cultures are rarely useful. Instead, diagnosis is based on clinical examination and the finding of white, curd-like exudates on the buccal and gingival mucosa and less frequently on the tongue and soft palate. The exudates can be scraped away to reveal an erythematous, mildly eroded, and painful mucosa underneath. Although the infection is frequently self-limited, infants with thrush should be treated with oral nystatin suspension to hasten healing and primarily to prevent problems with feeding (due to pain). Tinea cruris is most commonly caused by *Trichophyton* spp., as with other dermatophyte infections. The hallmark of cutaneous candidiasis is the presence of satellite papules and pustules beyond the margins of a patch of macerated, sometimes weeping skin with scalloped borders. It typically occurs in intertriginous areas such as the groin, axilla, or underneath pendulous skin folds.
- 12 Answer C. The patient is presenting in septic shock from an unclear source. She presents from a nursing home, where rates of methicillin-resistant *Staphylococcus aureus* (MRSA) and *P. aeruginosa* are extremely high. Treatment involves broad-spectrum

antibiotic coverage to cover both these pathogens. Metronidazole and clindamycin afford excellent anaerobic coverage, but piperacillin-tazobactam also kills anaerobes and double coverage of anaerobes is not routinely indicated. Choice B would be a reasonable regimen in a patient with septic shock who is not at risk for nosocomial pathogens.

- 13** Answer B. The Ottawa Ankle Rules (OAR) are a set of criteria that were devised to limit unnecessary ankle radiography in patients presenting with ankle pain. The criteria require ankle radiography in any patient with ankle pain who has the following:

1. Unable to ambulate four steps both at the time of injury and in the ED, or
2. Bony tenderness to palpation of the tip of either malleolus or tenderness of the distal 6 cm posterior to either malleolus.

The original paper, published in 1992, described a sensitivity of 100% and a specificity of 40%. Since then, however, several other studies have published a variety of other values, suggesting a wide variability for specificity and sensitivity somewhere >96%. However, even in the original paper (sensitivity of 100%), occasional patients had "insignificant" fractures such as chip fractures that would be managed in the same way as a sprain. The squeeze test involves squeezing the tibia and fibula approximately 5 cm proximal to the malleoli in an effort to provoke pain in the ankle. Increased ankle pain indicates disruption of the distal tibiofibular syndesmosis. The OAR have not been validated for pediatric use. Like other clinical decision rules, the OAR should not be used in unreliable patients such as patients with decreased mental status or intoxicated patients.

- 14** Answer E. This patient has acute alcoholic hepatitis. Although most cases of alcoholic hepatitis are subclinical or asymptomatic, it may be life threatening. Patients presenting for treatment are characterized by fever, right upper quadrant pain, jaundice, anorexia, and occasionally nausea and vomiting. Physical examination most commonly reveals hepatomegaly (as opposed to the shrunken, firm liver in patients with cirrhosis), jaundice, ascites, splenomegaly, and signs of alcohol withdrawal. AST and ALT levels are only modestly elevated, typically remaining below 300 U per L, and the ratio of AST:ALT is usually greater than 2:1. Bilirubin levels are elevated but are variable depending on the severity of the disease. Leukocytosis is common, with a mean WBC count of 12,400 per mm³, whereas counts up to 20,000 are not uncommon. Fever is a common finding but concomitant infection is uncommon. Bilirubin levels and the prothrombin time

(PT) have been classically used to stratify patients into low or high-risk categories by calculating the Maddrey discriminant function.

Discriminant function =

$$4.6 \times (\text{PT in seconds} - \text{control in seconds}) + \text{bilirubin (mg per dL)}.$$

Levels over 32 correspond with severe disease and a 1-month mortality >50%.

- 15** Answer E. Hypertrophic cardiomyopathy is usually a familial condition, which causes increased left ventricular and septal wall size and resultant diastolic dysfunction. Left ventricular hypertrophy can eventually lead to outflow obstruction. Clinical clues include exertional syncope or chest pain in young patients with a systolic murmur at the left lower sternal border. Any agents which increase systemic afterload (phenylephrine) or cardiac contractility (digitalis, isoproterenol) or decrease preload (furosemide) are contraindicated in patients with hypertrophic cardiomyopathy.
- 16** Answer E. The Salter-Harris classification is used to describe pediatric long bone fractures near the growth plate. Type I fractures go through the physis only, type II from the metaphysis into the physis, type III from the epiphysis into the physis, type IV is a combination of types II and III, and type V is a crush injury to the physis. The most common is type II. Types I and V may be invisible on initial plain films. Type V carries the poorest prognosis.
- 17** Answer E. For any patient with acute urinary retention, the goal is to find the cause of urinary obstruction and correct it as rapidly as possible. In this case, as in the majority of older men, the most likely cause is benign prostatic hypertrophy (BPH). Pain and distension in the suprapubic area indicates bladder distention from a more distal obstruction. The correct management is to urgently place a Foley catheter to temporarily stent open the prostatic urethra and decompress the bladder. Any imaging and blood studies may follow this initial management, but should not delay relief of the obstruction. Further management usually involves a basic chemistry panel to assess kidney function, urinalysis to look for concomitant infection, and outpatient urology follow-up.
- 18** Answer B. The patient has toxic epidermal necrolysis (TEN), which is a vesiculobullous disease that is characterized by diffuse epidermal detachment. It is part of a continuum with Stevens-Johnson syndrome (SJS) and is diagnosed when the degree of epidermal detachment exceeds 30% of the body surface

area (whereas SJS is diagnosed when epidermal detachment is $<10\%$). Drug exposure, particularly to sulfonamides, and to a lesser degree, anticonvulsants, is the most common cause of SJS and TEN. A recent urinary tract infection implies that this patient had been taking trimethoprim/sulfamethoxazole when she developed TEN. (Figure © David Effron, MD, 2004. Used with permission.)

- [19] Answer A. Acute spinal cord injuries may benefit from high-dose corticosteroid therapy if given within 8 hours of injury. A longer delay than this may actually result in worsened outcomes. Normal saline or lactated Ringer's hydration should be given to all trauma patients. Naloxone may be given to patients with altered mental status as empiric therapy for opioid intoxication but is not generally used in patients with spinal cord injury. Vancomycin and other antibiotics are not routinely indicated in trauma patients, except in clinically evident cases of posttraumatic infection. Vasopressin may be used in patients with medical causes of shock who do not respond to crystalloid or colloid administration but is unlikely to be useful in patients with traumatic shock.
- [20] Answer B. Kernig's and Brudzinski's signs are performed to evaluate for meningeal irritation in the patient who is suspected of having bacterial meningitis. Kernig's sign is elicited by having the patient lie supine with the hip flexed at 90 degrees. Extension of the knee in this position causes pain down the posterior thigh or lower back in patients with inflamed meninges. Brudzinski's sign is positive when flexion of the neck of a supine patient causes involuntary flexion of the hips. These named signs have poor sensitivity (in the range of 10% to 40%) but good specificity (in the range of 80% to 100%). Positive and negative predictive values are affected by the prevalence of a given disease in the population being studied. In contrast, sensitivity and specificity are not affected by prevalence but are unique characteristics of a given test.
- [21] Answer C. Spinal injuries are classified by the mechanism of injury and mechanical stability in reference to their potential to cause neurologic damage. Unstable injuries are considered likely to cause spinal cord damage and usually require surgical stabilization. Stable spinal injuries are more common than unstable ones and are easier to remember because there are only a few types—wedge fracture, spinous and transverse process fractures, unilateral facet dislocation, and vertebral burst fracture (with the exception of a Jefferson fracture, which is a burst fracture of C1). All other spinal injuries are considered potentially or definitely unstable. A flexion teardrop fracture occurs when the anterior portion of the vertebral body shears off from a flexion force, causing ligamentous disruption. Bilateral facet dislocation is an extremely unstable injury resulting from significant flexion, causing the superior facets of the inferior vertebra to lose their articulation with the inferior facets of the vertebra immediately superior to it. Spinal cord injury is common due to the significant displacement of the vertebrae. Solitary transverse process fracture is usually of no clinical significance as it is far removed from the articular surfaces of the vertebrae and spinal cord. A Hangman's fracture occurs from extreme extensor forces, causing bilateral fractures of the pedicles of C2 and dislocation of C2 from C1. Unlike the past where hanging gave this fracture its name, the common mechanism now is motor vehicle collision. The Jefferson fracture results from vertical compression forces causing the anterior and posterior portions of the ring of C1 to break and putting the spinal cord at extreme risk for severe injury.
- [22] Answer D. Endocarditis in intravenous drug users (IVDUs) is different from that in nondrug users in several ways: Patients are generally younger, almost universally have fever, and have more pulmonary symptoms due to right-heart vegetations causing septic emboli to the lungs. Although *S. aureus* is a far more common cause of endocarditis in IVDUs, it has less mortality among this patient population. Heart murmurs are less commonly heard in endocarditis in IVDUs because the tricuspid valve, the most common valve affected, is difficult to hear on physical examination. Splinter hemorrhages and Roth spots are, if anything, less common in right-heart endocarditis as the lungs will filter most septic emboli.
- [23] Answer E. Overdose with an antihypertensive causing bradycardia, hypotension, and depressed mental status is most likely from a calcium channel blocker (CCB) or β -blocker. These overdoses can be lethal, especially in children. Traditional treatment has focused on atropine, glucagon, and calcium to counteract the effects of both classes of drug. Atropine reverses the effect of vagal stimulation and prevents further bradycardia. Glucagon functions independently of the β -receptor to improve inotropy and chronotropy. Calcium competes for the calcium channel in CCB overdose. Recently, high-dose insulin and glucose has been found to be beneficial in the management of severe overdoses of β -blockers, and probably helps with CCB overdoses as well. Of note, these symptoms could also be due to clonidine, which can cause severe hypotension, bradycardia,

respiratory depression, miosis and somnolence or altered mental status. Such symptoms may be mistaken for acute opioid intoxication or overdose. Naloxone has been advocated by some authors although it may cause severe hypertension and its use is controversial. Generally, the treatment of clonidine overdose is aggressive supportive care (decontamination with charcoal, intravenous crystalloids, pressors).

- 24** Answer C. The patient has evidence of moderately severe community-acquired pneumonia, with tachycardia, tachypnea, and hypoxia. Accordingly, the patient should be admitted to the hospital for intravenous antibiotics and fluids and oxygen. Community-acquired pneumonia in this age-group is most commonly due to pneumococcus, atypical organisms, and gram-negative bacilli. Among the choices in the preceding text, C is the most appropriate. Other acceptable regimens could include a fluoroquinolone or ampicillin-sulbactam. Oral medications and discharge would not be appropriate because of the vital sign abnormalities and comorbidities. Clindamycin possesses little gram-negative coverage and would not be adequate therapy. Piperacillin-tazobactam is a potent, broad-spectrum, antipseudomonal antibiotic used only for nosocomial pathogens causing severe illness.
- 25** Answer A. IVDUs have bacteria that are transmitted through the skin to superficial veins, into the greater venous circulation, and eventually to the heart. These pathogens (*S. aureus* in more than three fourths of cases) lodge most commonly in the tricuspid valve to cause right-heart endocarditis and may lead to septic pulmonary emboli.
- 26** Answer C. The MB fraction of creatine kinase is present mostly in cardiac muscle, but also in small quantities in skeletal muscle. Levels of CK-MB begin to rise between 3 and 8 hours after infarction, peak at 12 to 24 hours, and return to normal within 3 days. Neither the sensitivity nor the specificity of CK-MB at 3 hours after acute MI is >50%.
- 27** Answer E. This patient experienced scombroid fish poisoning. Although not an allergic reaction, the symptoms are due to excessive histamine levels in the fish and results in symptoms that are very similar to an allergic response. This patient's prior history of avid seafood intake also points against allergy. Histamine levels build up in inadequately refrigerated, or inadequately preserved dark-muscled fish due to the action of histidine decarboxylase by enteric bacteria in the fish. Symptoms usually occur within minutes of eating the fish and include severe throbbing headache, facial flushing and a sense of diffuse warmth, a burning sensation in the mouth and throat, palpitations, nausea, anorexia, vomiting, abdominal cramps, conjunctival injection, and pruritus. Symptoms are rapidly relieved after the injection of parenteral antihistamines such as diphenhydramine or cimetidine and most symptoms will have completely abated within 6 hours. The patient should not be told that he or she has an allergic reaction and they should not be prevented from eating fish in the future.
- 28** Answer C. The patient likely has a testicular tumor, usually of germ-cell type in this age-group. Evaluation may include screening for metastases with a chest x-ray and a CT scan of the abdomen and pelvis, although this may occur on an urgent outpatient (rather than emergent inpatient) basis. Emergent surgery is not indicated in patients with testicular tumors except in certain patients who have evidence of testicular torsion. Azithromycin may be used to treat chlamydial epididymitis but has no role in the management of testicular tumors. Scrotal elevation is often used as a diagnostic maneuver to distinguish between epididymitis and testicular torsion (relief is called *Prehn's sign*), but it is an unreliable finding for this purpose. Corticosteroids may be used in patients with testicular tumors as part of certain chemotherapeutic regimens but has no role in the acute management. (Figure courtesy of Mark Silverberg, MD. Reprinted with permission from Silverberg M. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:330.)
- 29** Answer C. Patients on β -blockers may be difficult to treat in the setting of anaphylaxis. On the one hand, β -blockade may blunt or prevent some of the beneficial effects of epinephrine. However, epinephrine also has the potential to worsen anaphylaxis in the setting of beta blockade due to subsequent unopposed alpha receptor stimulation. This may result in an increased release of the vasoactive mediators in anaphylaxis. Clinically, this may be manifest in worsened bronchoconstriction, bradycardia, and coronary vasoconstriction. Like epinephrine, glucagon exerts its influence through the formation of intracellular cyclic AMP. However, glucagon bypasses the β -adrenergic receptor by binding to a discrete G protein receptor. Therefore, glucagon may be effective even in the setting of β -blockade. This is also the basis for glucagon's use in β -blocker overdose. Other agents that may be beneficial include vasopressors (dopamine, norepinephrine), nebulized albuterol (specifically for relief of bronchospasm), atropine (for bradycardia), and isoproterenol (as a last resort).

30 Answer C. Uncomplicated pertussis in an unvaccinated child is a clinical diagnosis. In children, the illness classically follows a three-stage pattern—the catarrhal phase, paroxysmal phase, and convalescent phase. The catarrhal phase usually lasts between 5 and 10 days but may last up to 3 weeks. During this phase, it is impossible to clinically differentiate these patients from patients with common cold. Unfortunately, patients are most contagious during this phase. Patients are typically afebrile or have only a minimal fever during this phase and throughout the illness. The presence of significant fever should prompt a search for a secondary infection. Additional typical symptoms include rhinorrhea, mild cough, sneezing and occasionally conjunctivitis. These signs may be absent in very young infants. The paroxysmal phase is characterized by paroxysms of cough, often occurring during the night and associated with post-tussive emesis, especially in young infants. The inspiratory whoop, which is responsible for the common name, Whooping Cough, given to *Bordetella pertussis* infections, occurs at the end of a paroxysm, as air is inspired against a partially closed glottis. Owing to the immaturity of their respiratory system, young infants are susceptible to developing apneic episodes during this phase, as well as choking or gasping for air. Apnea and choking may be sufficiently prolonged to cause hypoxia and cyanosis. Therefore, infants and toddlers presenting during the paroxysmal phase frequently require admission to an intensive care unit (ICU) setting where appropriate monitoring can be provided. Feeding may also be a problem during this phase, as it may provoke paroxysms of coughing and subsequent vomiting. Therefore, several infants and toddlers with this disease present with severe dehydration. The paroxysmal phase typically lasts from 1 to 6 weeks. During the convalescent phase, the paroxysms typically become less frequent and less distressing, although the cough may actually become louder. Although classical pertussis is a clinical diagnosis, lymphocytosis supports the diagnosis. Absolute lymphocyte counts $>20,000$ per mm^3 may be seen with a total WBC count $>100,000$ per mm^3 . The chest x-ray is most often normal, although it may demonstrate a “shaggy” right-heart border. However, the presence of an infiltrate may indicate a secondary infection as bacterial pneumonia may complicate pertussis in up to 20% of patients. Although the incidence of *B. pertussis* is rising in the population as a whole, this rise is almost solely due to an increase in the number of adolescents and adults with the disease. However, children and infants still represent most cases of *B. pertussis*. Thirty-eight percent of cases occur in infants younger than 6 months and 71% of cases occur in children younger than

5 years. Additionally, adolescents and adults more often present with atypical signs and symptoms such as an isolated spasmodic cough without an associated inspiratory whoop. Previously vaccinated adults rarely demonstrate the lymphocytosis that is characteristic of pediatric infections.

31 Answer D. Penicillin remains the drug of choice for GAS pharyngitis. The standard course of therapy is Penicillin V 500 mg every 6 hours for 10 days. There is some evidence that twice-daily dosing may be equally efficacious but the guidelines remain at 6-hour dosing intervals. Alternatively, 1.2 million units of penicillin G benzathine may be given as an intramuscular injection in the ED (in adult patients). Pediatric patients may also receive penicillin G but the dosing is weight based. In patients with a penicillin allergy, erythromycin is the drug of choice, given 400 mg four times per day for a 10-day course. None of the other drugs listed are effective against GAS infections. Alternatives to erythromycin include azithromycin, cefadroxil, cephalexin, and clindamycin.

32 Answer C. Fluid loss in patients with toxic epidermal necrolysis (TEN) is sizable but not as severe as in burn patients. However, the widely denuded skin is an easy access point for a variety of bacteria and sepsis is the most common cause of death.

33 Answer E. Cluster headaches may be associated with ipsilateral autonomic instability reflecting both sympathetic dysfunction such as ptosis, miosis, and forehead as well as facial sweating and parasympathetic activation, such as rhinorrhea, lacrimation, and nasal congestion. Owing to the combination of these findings in concert with the distribution of pain, it is thought that the area responsible for cluster headaches is the cavernous sinus. In the cavernous sinus, the trigeminal nerve, sympathetic and parasympathetic fibers converge.

34 Answer C. The patient has ecchymosis and deformity of his penile shaft indicative of penile fracture. Although important ancillary studies such as ultrasonography, retrograde urethrography, and cavernosography may be necessary for further evaluation, definitive management almost always requires urgent urologic repair. Conservative management with penile splinting and pressure dressings has an unacceptably high risk of complications such as deformity and impotence. Foley catheterization may be performed in patients without urethral injuries to help guide the surgical repair. (Figure courtesy of Donald Saltee, MD. Reprinted with permission from

Sallee D. *Greenberg's text-atlas of emergency medicine*. Lippincott-Williams & Wilkins; 2004:318.)

- 35** Answer C. The patient has severe tongue swelling, likely from angiotensin-converting enzyme (ACE) inhibitor-induced angioedema given the history of new antihypertensive medication. Pathophysiology involves buildup of bradykinin due to inhibition of angiotensin converting enzyme. Acute treatment with epinephrine, steroids, and antihistamines is generally ineffective. Fresh frozen plasma contains kininase II, which can cleave bradykinin and reduce the angioedema. Verapamil, metoprolol, and aldosterone have no role in the management of angioedema. Danazol is used for angioedema due to hereditary C1 esterase inhibitor deficiency, but its role is generally limited to prophylaxis rather than acute treatment. (Figure reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004. Courtesy of Robert Hendrickson, MD.)
- 36** Answer C. *Salmonella* is a common cause of acute infectious diarrhea in the United States. Most cases are caused by non-*typhi* strains and present with crampy abdominal pain, fever, and watery diarrhea with occasional bloody stools. Nausea and vomiting also commonly occur but are typically mild. Ten percent of household pets excrete *Salmonella*, although poultry products are the most common source, including eggs. Immunocompromised patients, such as patients with underlying leukemia, lymphoma, sickle cell anemia or acquired immune deficiency syndrome (AIDS), are more susceptible to bacteremia and severe infection. Most patients with salmonellosis are effectively managed with supportive care alone and will be better by the time stool cultures have revealed the infecting organism. Furthermore, treatment with antibiotics prolongs shedding of non-*typhi* strains. Therefore, antibiotics should only be used for patients who represent a public health risk (e.g., food or health care workers) or for patients who are ill with persistent infection. Ciprofloxacin, norfloxacin, and azithromycin are all effective for outpatient management. Ceftriaxone is the drug of choice for inpatient management.
- 37** Answer E. The patient is exhibiting signs of the Jarisch-Herxheimer reaction after treatment for secondary syphilis with penicillin G. The reaction occurs because massive death of spirochetes on exposure to the penicillin causes systemic symptoms in a serum sickness-like reaction. Treatment is symptomatic with acetaminophen or ibuprofen. An allergic reaction to the antibiotic that he was given is possible, but there were no urticaria demonstrated on physical examination and the rash that was present was already there before the antibiotic treatment. The patient should not be intubated or given epinephrine because of the lack of upper airway or pulmonary symptoms. Prednisone, diphenhydramine, and famotidine would be useful in an allergic reaction but have little role in the management of the Jarisch-Herxheimer reaction.
- 38** Answer D. CHF is increasing in prevalence in the United States and the mortality for severe cases is extremely high. Mortality has been reduced by β -blockers and ACE inhibitors as well as automated internal cardiac defibrillators. Exacerbations of CHF are commonly due to medication noncompliance, dietary indiscretion, dysrhythmias, MI, pulmonary embolism (PE), and infections.
- 39** Answer E. This patient has hypercalcemic crisis (generally defined as any patient with a serum calcium > 14 mg per dL), which is typically characterized by altered mental status, polyuria, and dehydration. The initial goals are to restore intravascular volume with intravenous saline and to rapidly lower the serum calcium level by enhancing urinary excretion and reducing bone resorption (primarily through osteoclast inhibitors such as pamidronate or other bisphosphonates). Calcium channel blocker (CCBs) such as nifedipine play no role in the treatment of hypercalcemia. Loop diuretics are the most effective drugs in enhancing urinary calcium elimination. In contrast, thiazides increase calcium reabsorption in the distal tubule resulting in a further increase in serum calcium levels. Calcitonin is the fastest acting, but weakest agent in reducing serum calcium and cannot be used for monotherapy. Bicarbonate is not useful in hypercalcemia. However, in the setting of a true alkalosis, more free calcium will be bound to albumin, thereby decreasing the amount of free ionized calcium. Glucocorticoids are useful in patients with hypercalcemia caused by an underlying hematologic malignancy or granulomatous disease due to their effects on vitamin D metabolism and cytokine release. Glucocorticoids do not exert their effect for 1 to 2 days after initiation of treatment.
- 40** Answer B. Cerebral edema is the most feared complication of diabetic ketoacidosis (DKA) treatment in children. Although reports vary, cerebral edema complicates roughly 1% of pediatric DKA cases, with a mortality rate of 20% to 90%. Survivors have persistent neurologic sequelae 20% to 40% of the time. The development of cerebral edema is almost exclusively a complication of pediatric DKA. There is still no consensus regarding the etiology of cerebral edema in pediatric DKA. However, early clinical

signs include headache, vomiting, decreased arousal, relative bradycardia, and relative hypertension.

Headache is not a typical feature of patients with NPH.

41 Answer C. Transient synovitis is the most common cause of atraumatic hip pain in children. It usually occurs in children <6 years old, and the cause is unknown. Referred pain to the knee may be the only complaint, so careful inspection of the hip is mandatory in all patients with isolated knee pain. Diagnosis is made by excluding other more serious causes of hip pain, namely septic arthritis, fracture, slipped capital femoral epiphysis (SCFE), and Legg-Calve-Perthes disease. Patients with transient synovitis are less likely than those with septic arthritis to have fever, elevated erythrocyte sedimentation rate (ESR), and tenderness of the hip. Management of transient synovitis is purely supportive with rest and NSAIDs. Hip fracture in the pediatric patient is suggested by high-force trauma and severe tenderness is common. Osteogenesis imperfecta is a rare disease that causes problems in bone synthesis due to collagen defects. Frequent fractures are common and physical examination may demonstrate blue sclerae, deafness, and ligamentous laxity. Sub-clinical cases may be more common than previously recognized. SCFE occurs when the femoral epiphysis slips off the metaphysis, usually in adolescents. Legg-Calve-Perthes disease is avascular necrosis of the femoral head due to unknown reasons. It occurs from childhood to adolescence but is less common than transient synovitis.

42 Answer A. NPH was initially described in 1965 as a triad of difficulties of gait (ataxia), altered mentation (dementia), and urinary sphincter dysfunction (incontinence) in concert with enlarged ventricles (hydrocephalus) but apparently normal cerebrospinal fluid (CSF) pressure upon lumbar puncture (LP). Recent research has shown that while the CSF pressure may be normal during a single LP, patients with NPH experience transient increases in CSF pressure which can now be appreciated in centers capable of performing CSF monitoring. Therefore, many authors have advocated changing the name of this illness to "chronic hydrocephalus." Though there is no "classic" gait, walking difficulties are the most consistent and prominent feature of NPH. Furthermore, ataxia is most likely to improve after CSF shunting. Alterations in cognition and mentation may be so mild that they are not noticed by either the patient or the patient's family and the term *dementia* is overly broad generalization. Urinary incontinence is present only in the later stages although a sensation of urinary urgency is almost always present. Pappilledema is a sign of increased intracranial pressure.

43 Answer D. This patient has erythema multiforme (EM) minor, which is a relatively benign disease that results from host hypersensitivity to an antigenic challenge. EM minor is at the benign end of a clinical spectrum that includes EM major, Stevens-Johnson syndrome (SJS), and toxic epidermal necrolysis (TEN). The classic rash is typically symmetric and involves the extremities, palms, and soles. The archetypal lesion is a "target" lesion measuring <3 cm and consisting of two concentric rings around a dusky, central disk. Mucosal involvement almost never occurs in EM minor, whereas it is very common in EM major and is almost exclusively limited to the oral cavity. Nikolsky's sign is not present in either EM minor or major. Corticosteroids are sometimes used for treatment but their benefit has not been proved. Immunoglobulin plays no role in treatment. The lesions resolve without intervention within 1 to 3 weeks. Although almost 50% of cases of EM minor are idiopathic, HSV is the most common infectious agent triggering the disease. EM minor and major are typically caused by infectious agents, whereas SJS and TEN are typically due to drug exposure. (Figure courtesy of Colleen Campbell, MD. Reprinted with permission from Campbell C. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:395.)

44 Answer B. AS usually occurs due to congenital bicuspid structure, calcific degeneration, or rheumatic heart disease. The classic murmur is a systolic crescendo-decrescendo murmur at the right upper sternal border or cardiac base. The natural history of AS usually follows a sequence of findings, starting with angina, followed by syncope, and then heart failure. As each subsequent finding occurs, the mortality increases significantly. Valve replacement is the only definitive treatment once symptoms appear.

45 Answer D. The EKG shows a regular, narrow complex tachycardia at a rate of 175, most likely paroxysmal atrioventricular (AV) nodal reentrant tachycardia. The patient is hemodynamically unstable and synchronized cardioversion at 50 J is indicated after appropriate sedation. Adenosine is the next best option, but hypotension and severe symptoms warrant more emergent conversion to sinus rhythm. Diltiazem and amiodarone can be used to convert the rhythm, but will cause further hypotension. Defibrillation is only indicated in patients who lack pulses (ventricular fibrillation, pulseless ventricular tachycardia).

- 46 Answer A. Dental infections are by far the most common cause of Ludwig's angina (98% to 99% are odontogenic), and Ludwig's angina may follow dental extraction. Other predisposing conditions include diabetes mellitus, malnutrition, alcoholism, immunocompromised states such as AIDS or organ transplantation, mandible fractures, tongue piercing, peritonsillar or parapharyngeal abscesses, submandibular sialoadenitis and trauma. Ludwig's angina describes a rapidly progressive gangrenous cellulitis of the soft tissues of the neck and floor of the mouth that originates in the submandibular space. Patients present with dysphagia, neck swelling, neck pain, and elevation of the tongue. Airway compromise may occur rapidly and without warning, so attention to the airway is the primary task of emergency physicians.
- 47 Answer D. Ten percent to 25% of patients with gout have renal stones, and the rate correlates with the degree of hyperuricemia. For example, >50% of patients with a serum uric acid level >13 mg per dL have stones.
- 48 Answer C. Patients with penetrating injuries just lateral to the spine often have incomplete cord injury, usually causing hemisection of the cord, known as *Brown-Sequard syndrome*. Neurologic findings include loss of ipsilateral motor function and vibratory/position sensation and contralateral pain/temperature sensation distal to the injury. The fibers carrying pain/temperature sensation decussate (cross) a few levels after they enter the cord from the periphery, so contralateral findings are observed. The fibers carrying motor axons and vibratory/position sensation do not decussate until high in the spinal cord, so ipsilateral findings predominate. The functional outcome for patients with cord hemisection is favorable overall with few patients losing bowel, bladder, or ambulatory function.
- 49 Answer B. It may be difficult to clinically differentiate between patients with central and peripheral vertigo. However, peripheral vertigo is classically associated with marked nausea and vomiting. Furthermore, peripheral vertigo more commonly occurs along with auditory symptoms such as hearing loss, tinnitus, or a feeling of pressure or fullness in the ear. Although all patients with vertigo may have some difficulty walking, many patients with central lesions cannot even stand or take a single step without falling. In contrast, patients with peripheral vertigo can usually walk, even in the acute phase of their illness. This is why it is important to encourage patients with vertigo to walk during bedside examination. Finally, nystagmus is an important physical examination finding in patients with vertigo. Spontaneous nystagmus of peripheral origin does not change direction with gaze to either side. Nystagmus in such patients, however, does increase in amplitude when patients look in the direction of the fast phase (known as the *Alexander's law*). In patients with central lesions, nystagmus generally changes direction when the patient looks in the direction of the fast phase. Nystagmus that is purely vertical (upbeat or downbeat nystagmus) is almost always caused by a central lesion, typically of brainstem vestibular pathways. Finally, nystagmus due to peripheral lesions typically fatigues or ceases when the patient fixates his or her vision on a target object. Fixation does not generally affect nystagmus due to central lesions.
- 50 Answer C. Floaters with or without painless visual loss is the usual clinical presentation of retinal detachment. Direct funduscopy and visual acuities may be completely normal if the detachment is peripheral or small. The elevated retina will appear out of focus and as a hazy gray membrane. Ophthalmologic consultation should be emergent since reattachment is often successful if performed early in the disease course.
- 51 Answer C. Asymptomatic bacteriuria is a common finding amongst healthy pregnant and nonpregnant women. There is a slightly higher incidence of asymptomatic bacteriuria amongst pregnant women, ranging from 2% to 10% (vs. 1% to 5% in nonpregnant women). However, most of these women have preexisting bacteriuria, which is detected during routine early pregnancy screening. It is critical to treat all pregnant women with asymptomatic bacteriuria because pregnant women with asymptomatic bacteriuria have a 20- to 30-fold increased rate of pyelonephritis. The development of pyelonephritis in pregnancy increases the risk of preterm delivery and low birth weight infants. The increased risk of pyelonephritis in pregnancy is a result of ureteral stasis, which is due in part to the effects of progesterone on ureteral peristalsis and in part to the effects of direct uterine compression of the ureters. The uterus primarily compresses the right ureter such that 75% to 80% of pyelonephritis cases in pregnancy are right sided. As in nonpregnant women, the principle pathogens in pregnant women with urinary tract infection are *E. coli*, *K. pneumoniae*, and *Proteus* spp.
- 52 Answer C. Although CT scan is the most sensitive imaging technique for viewing pelvic fractures, plain films may add important anatomic information for

the orthopedist. The Judet view is an oblique view most helpful for viewing the acetabulum. The Judet x-ray should never be performed in unstable patients, as isolated acetabular fracture rarely causes severe hemodynamic compromise. The AP view of the pelvis is the most important initial x-ray of pelvis to obtain in the general trauma patient.

53 Answer E. Tricyclic antidepressants cause *blockade* of the following: α -1, muscarinic, histamine, GABA, cardiac potassium efflux, fast sodium channel, serotonin reuptake, and norepinephrine reuptake. Because of these effects and the potential for lethality in overdose, they are no longer indicated as first-line therapy for the management of major depression.

54 Answer C. The picture demonstrates hemotympanum, indicative of a basilar skull fracture in the middle fossa. Other signs of middle fossa fracture include Battle's sign (posterior auricular ecchymosis), otorrhea, facial nerve palsy, and hearing loss. Signs of anterior fossa fractures include cerebrospinal fluid (CSF) rhinorrhea and raccoon eyes (bilateral periorbital ecchymoses). Signs of posterior fossa fractures involve impairment in swallowing and maintenance of airway due to cranial nerve IX and X injuries. Otitis media is unlikely to be involved in patients with head trauma. (Figure from Benjamin B, Bingham B, Hawke M, et al. *A color atlas of otorhinolaryngology*. Philadelphia: JB Lippincott Co; 1995. Artwork © Bruce Benjamin, Brian Bingham, Michael Hawke, and Heniz Stammberger, with permission.)

55 Answer A. In children, rubella (German measles) is characterized by a minimal prodromal illness (as opposed to adults), a "3-day rash," and generalized lymphadenopathy. Forchheimer spots, pinpoint or larger erythematous spots on the soft palate, may also be found. However, similar lesions may also be seen in measles and scarlet fever, so the presence of Forchheimer spots is not pathognomonic for rubella. The rash is a pink-red maculopapular eruption that first appears on the face and rapidly spreads downward to the neck, arms, trunk, and legs. On the second day, it begins to disappear from the face and the entire rash typically disappears by the end of the third day. Lymphadenopathy is generalized but most commonly involves the suboccipital, postauricular, and cervical nodes. Although lymph node tenderness typically subsides after 1 to 2 days, lymphadenopathy may persist for several weeks. Tonsillar exudates are present in several causes of pharyngitis. Koplik's spots are pathognomonic for measles. Febrile seizures classically occur in patients with roseola infantum (exanthem subitum). Pastia's lines occur in scarlet fever.

56 Answer A. The rotator cuff is a group of muscles composed of the supraspinatus, infraspinatus, teres minor, and subscapularis (SITS). Its primary function is to stabilize the shoulder joint. It is most commonly injured chronically with repetitive motions or acutely with a fall on an outstretched hand. The supraspinatus is the most common of the rotator cuff muscles to be injured. Physical examination of patients with supraspinatus tears indicates inability to maintain active abduction at 90 degrees without limitation in passive range of motion. Diagnosis may be confirmed with MRI and acute tears may require early surgery. The deltoid muscle is not technically part of the rotator cuff.

57 Answer C. This patient has Bell's palsy. Bell's palsy is defined as paresis or paralysis of the facial nerve (seventh cranial nerve), which is usually unilateral. The first step in the diagnosis is to determine that the paresis or paralysis is due to a peripheral instead of a central nervous system (CNS) lesion. In patients with CNS lesions, furrowing of the eyebrows and closure of the eye is unaffected. This is due to the fact that the neurons of the facial nucleus that innervate the upper face receive input from both cerebral hemispheres (whereas the neurons of the facial nucleus that innervate the lower face receive input primarily from the contralateral cerebral hemisphere). A CT scan would only be necessary in patients with evidence of a CNS lesion upon physical examination. The presence of a vesicular rash over the ear indicates Ramsay-Hunt syndrome. Ramsay-Hunt syndrome, also known as *herpes zoster oticus*, results from reactivation of Varicella Zoster virus in the geniculate ganglion of the facial nerve. It is much less common and carries a more severe prognosis for recovery than Bell's palsy of unknown cause or Bell's palsy due to reactivation of HSV. More than 75% of patients will recover without treatment. Therefore, medical treatment is aimed at the remaining population. Because it is not possible to identify which patients will recover fully without treatment, all patients are generally treated upon making the diagnosis. The treatment for Bell's palsy includes corticosteroids, antiviral agents directed against herpes viruses (acyclovir, valacyclovir, famciclovir), and artificial tears and eye ointment to prevent corneal drying. There is disagreement over the best regimen and the timing of presentation. However, it is generally felt that earlier treatment yields better results and that corticosteroids are of limited utility if a patient presents after 7 days of symptoms. Patients with diabetes and hypertension have a more severe course and less complete recovery. Recurrence of Bell's palsy

rarely occurs. In cases of recurrence, consideration should be given to alternative diagnoses.

- 58** Answer D. Rheumatic fever occurs several weeks after untreated streptococcal pharyngitis. The diagnosis is made by the Jones criteria—either two major (polyarthritides, erythema marginatum, chorea, carditis, subcutaneous nodules) or one major and two minor (arthralgias, fever, increased ESR or C-reactive protein (CRP), prolonged PR interval). Migratory arthritis of major joints is the most common symptom, followed by carditis. Chorea and erythema marginatum are uncommon, but fairly specific given a history of antecedent pharyngitis. Fever is neither sensitive nor specific.
- 59** Answer E. The most common acid-base disturbance in the setting of acute asthma exacerbations is a respiratory alkalosis. However, concomitant metabolic acidosis due to lactic acidosis occurs in up to 28% of patients. The etiology of the lactatemia is not known but it has been hypothesized to occur because of fatiguing respiratory muscles. However, recent case reports have demonstrated that lactatemia can occur even in intubated patients who are paralyzed and therefore have no respiratory muscle action. Regardless, the clinical relevance of an elevated lactate level accompanying an acute asthma exacerbation is not known, and lactate levels do not predict respiratory failure in critically ill patients. The presence, however, of a respiratory acidosis as indicated by the ABG above is an ominous sign. A normal or elevated P_{CO_2} in a tachypneic asthmatic typically suggests severe obstruction and impending ventilatory failure. Exceptions to this rule occur most commonly in patients with underlying chronic obstructive pulmonary disease who may retain CO_2 at baseline. However, such patients should have a normal pH and an elevated HCO_3^- owing to chronic renal compensation. Leukocytosis, mild hypokalemia and eosinophilia are not useful in the management of acute asthma.
- 60** Answer C. Rheumatic heart disease most commonly predisposes the mitral valve to structural damage as well as susceptibility to infective endocarditis. The tricuspid valve is affected most often in patients who use IV drugs. The pulmonic valve is not usually affected by rheumatic heart disease or endocarditis. Irregularities of the aortic valve are usually due to congenital bicuspid structure, calcific degeneration, or less commonly, rheumatic heart disease.
- 61** Answer C. Major depression is a type of mood disorder which requires either depressed mood or anhedonia (loss of interest or pleasure in pleasurable activities) for the diagnosis. According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria, symptoms need to be present for 2 or more weeks for formal diagnosis. Symptoms include disturbances in appetite, sleep, concentration, activity, and energy and thoughts of guilt or suicide. The symptoms should not be caused by a thought disorder, medical condition, or substance abuse. Delusions and visual hallucinations are more characteristic of thought disorders than major depression. Major depression is almost ten times as common as bipolar disorder. It is extremely difficult to distinguish dementia from depression in the elderly on clinical grounds alone. Sometimes a trial of antidepressant therapy may be necessary to make the diagnosis—major depression is extremely responsive to pharmacotherapy whereas dementia is not.
- 62** Answer D. Boehler's angle is used to help evaluate the calcaneus in the setting of calcaneal fractures. Boehler's angle is formed by the intersection of a line drawn from the apex of the anterior tuberosity to the apex of the posterior facet and a line from the apex of the posterior tuberosity to the apex of the posterior facet. It normally measures between 20 and 40 degrees. Angles <20 degrees are suggestive of compression of the posterior facet. The other angle pictured is the angle of Gissane (also known as the *crucial angle*) which can also be used to evaluate the posterior facet. (Figure reprinted with permission from Bucholz RW. *Rockwood and green's fractures in adults*. Lippincott Williams & Wilkins; 2005.)
- 63** Answer B. This patient has pityriasis rosea, which is a common, self-limited rash that is thought to be of viral etiology. It most commonly occurs between the ages of 10 and 35 with a mean age of 23. Approximately 20% to 50% of patients present with a "herald patch," a single, 2- to 10-cm salmon-pink plaque with a fine silvery scale that rings the border of the lesion. Many patients believe they have ringworm, and the lesion may commonly be mistaken for ringworm before the development of additional lesions (KOH testing can rule this out). Approximately 1 to 2 weeks after the herald patch, multiple additional 1- to 2-cm round and oval lesions develop on the trunk. The longitudinal axis of the oval lesions runs along the skin lines of the back and the overall pattern may resemble the branches of a pine tree. For this reason, pityriasis is often said to have a "Christmas tree" distribution. No treatment is necessary and the lesions resolve within 2 to 3 months, although ultraviolet B (UVB) phototherapy will hasten resolution and decrease pruritus. (Figure reprinted with permission

from Barankin B. *Stedman's illustrated dictionary of dermatology eponyms*. Lippincott Williams & Wilkins; 2004.)

- 64 Answer E. Aneurysms are most often asymptomatic and diagnosed incidentally on routine examination or imaging studies. Most symptomatic patients complain of vague abdominal pain or abdominal distension, although urinary retention and constipation may occur. Nausea occurs only in the setting of other symptoms pointing to the diagnosis. Acute abdominal pain or distension in patients at risk for abdominal aortic aneurysm (AAA) indicates rapid expansion or rupture.
- 65 Answer B. The pork tapeworm, *T. solium*, causes neurocysticercosis, an extremely common cause of seizures worldwide. Infection occurs after humans eat contaminated pork. The parasite multiplies in the small intestine and eventually enters the bloodstream and brain. The tapeworm produces cysts in the brain, which appear as ring-enhancing lesions on contrast CT scan. Seizures are the most common serious manifestation of disease. Praziquantel and corticosteroids are the medical treatment. Neurosurgical consultation is required in all cases to evaluate and manage increased intracranial pressure. *T. cruzi* causes Chagas disease, a cardiomyopathy due to parasitic infection occurring primarily in Latin America. *T. saginata*, the beef tapeworm, causes a self-limited gastroenteritis. *T. trichiura*, the whipworm, also causes gastroenteritis, which may lead to iron-deficiency anemia due to malabsorption. *L. braziliensis* causes chronic cutaneous ulcerations.
- 66 Answer B. Most radioisotopes decay by beta decay which results in the emission of high-velocity electrons or positrons called beta (in symbol) particles. β Particles penetrate the skin to approximately 8 mm and may result in skin burns, although customary clothing protects covered areas. Therefore, only exposed skin is susceptible to exposure. γ Rays are often emitted after β -particle emission and penetrate more deeply than β particles. γ Rays are responsible for the acute radiation syndrome. α Particles are helium nuclei and have very superficial penetration which is limited to the epidermis. They generally present no health hazard unless they are inhaled.
- 67 Answer D. Propanolol is the most dangerous β -blocker in overdose. It is highly lipophilic and readily enters the CNS, causing seizures and coma. β -Blocker overdoses commonly cause bradycardia, AV block, and hypotension, and less often lead to tachydysrhythmias. Hypoglycemia is much more common in children than in adults, and glucose should be part of the cocktail of atropine, glucagon, and insulin therapy for patients with β -blocker overdose. Hyperkalemia and renal failure may also occur, but much less often than seizure.
- 68 Answer C. The absolute lymphocyte count is not only the earliest indicator of the acute radiation syndrome, but it also provides prognostic information. Patients with an absolute lymphocyte count <500 have a very poor prognosis with very high lethality when the absolute lymphocyte count <100 . In contrast, patients with an absolute lymphocyte count $>1,000$ have significant, but usually no lethal injuries.
- 69 Answer D. The patient presents in stage IV hemorrhagic shock, with tachycardia, hypotension, and alteration of mental status. These patients will require both crystalloid and colloid fluid resuscitation during the primary survey. The initial blood product to administer to men in hemorrhagic shock should be type O positive uncrossmatched blood. Uncrossmatched blood is easily obtainable in the ED and may be given immediately, without laboratory analysis. The Rh factor may be positive in the donor unit when transfusing men and women beyond child-bearing years, as there is no danger of formation of antibodies which might occur in future pregnancies in Rh negative women of child-bearing age. Fresh frozen plasma is indicated to keep up with clotting factor losses when patients have received four to five units of packed red blood cell (RBC) transfusions during the course of a resuscitation.
- 70 Answer B. Generally, pediatric patients with oral burns can be safely discharged home with minimal or no ancillary testing. Delayed labial artery bleeding occurs 7 to 14 days after the initial injury, when the eschar falls off the wound. It typically responds to local direct pressure, although patients will occasionally require a figure-8 suture to control bleeding. Otherwise, the most serious complication of burns to the oral commissure is a cosmetic facial deformity. Therefore, patients should be urgently referred to a facial or oral surgeon for further evaluation and possible oral splinting. There is no correlation between an isolated oral burn and cardiac injury or myoglobinuria. However, the patient should receive a thorough examination to ensure that there are no other contact wounds indicating a more extensive electrical path.
- 71 Answer E. The abdominal film demonstrates gastric and duodenal dilation. Malrotation with midgut volvulus must be a leading consideration in any toxic-appearing infant with a history of sudden onset

bilious emesis. Malrotation occurs in approximately 1 in 500 live births, or about half as often as pyloric stenosis. Of all infants with malrotation, 75% will develop volvulus and 75% of these infants will present in the first month (most in the first week). Most infants present with acute-onset bilious emesis and obstruction. Plain films are usually nonspecific and may be normal, but they may also reveal the "double bubble" sign which reflects the dilated stomach and proximal duodenum (the intervening pylorus separates the two "bubbles," not shown in Figure 10-12). This may also be seen with duodenal atresia but that is an illness that presents in the newborn nursery. Malrotation with midgut volvulus is a life-threatening illness that requires emergent surgical intervention to reduce the volvulus and relieve the ischemia caused by constriction of the bowel's mesenteric blood supply. Necrosis of the bowel may occur in as little as 3 hours. (Figure reprinted with permission from Fleisher GR. *Atlas of pediatric emergency medicine*. Lippincott Williams & Wilkins; 2003.)

72 Answer C. Thromboembolic disease is the leading cause of death in pregnancy. The risk of deep venous thrombosis is highest in the postpartum period (puerperium), although the risk is elevated throughout pregnancy. Warfarin is contraindicated throughout pregnancy due to its strong association with fetal malformations even when given after the period of organogenesis (days 21 through 56 of fetal life). V/Q scans actually expose the fetus to more radiation than helical CT scans when looking for pulmonary embolism (PE).

73 Answer C. The patient has air-space consolidation in the right mid-lung field in the setting of trauma, which is consistent with a pulmonary contusion. Management is directed at adequate oxygenation and ventilation and prevention of secondary complications such as acute respiratory distress syndrome (ARDS) and pneumonia. There is no obvious pneumothorax present, although an occult pneumothorax may be picked up if CT chest is performed. On an upright chest x-ray, hemothorax would appear as a pleural effusion around the lower lung segments. Chest radiography is not specific for the diagnosis of traumatic aortic rupture, which requires CT angiography for definitive diagnosis. Cardiac contusion is an older term to describe blunt cardiac injury, which is diagnosed by a combination of EKG, echocardiography, and sometimes cardiac markers. (Figure courtesy of Robert Hendrickson, MD. Reprinted with permission from Hendrickson R. *Greenberg's text-atlas of emergency medicine*. Lippincott Williams & Wilkins; 2004:634.)

74 Answer E. ODS is a complication of hyponatremia treatment that most commonly affects alcoholics and patients with chronic malnutrition. It carries a grave prognosis with no known treatment. It does not typically occur after the treatment of patients with acute hyponatremia (<48 hours). Patients with pseudohyponatremia (e.g., diabetic patients with severe hyperglycemia) are not at risk for ODS and have normal sodium body stores. Sensory abnormalities are not common in ODS. The classic presentation is altered mental status (lethargy to coma) with pseudobulbar palsies and spastic quadriplegia after treatment for hyponatremia. Patients most commonly have an initial improvement in their sensorium after treatment of hyponatremia with hypertonic saline, but patients developing ODS then rapidly decline in the ensuing 48 to 72 hours. Most patients present 1 to 6 days after initial treatment of hyponatremia.

75 Answer D. Traumatic aortic injury (TAI) occurs most commonly from high-speed motor vehicle collisions causing blunt thoracic trauma. Most traumatic aortic ruptures are immediately fatal, but patients who survive to ED evaluation are usually successfully treated. The descending aorta just distal to the subclavian artery is the most commonly injured site. Chest and back pain are the most common symptoms. Diagnosis is made by a combination of chest x-ray and CT aortography. Management of TAI involves operative repair, but blood pressure and heart rate control with β -blockers is essential to prevent further damage to the aorta from shear forces. Labetalol is an ideal single agent for reduction of blood pressure and heart rate. Clonidine, hydralazine, and enalaprilat all reduce blood pressure, but often cause reflex tachycardia and require a β -blocker in addition to reduce the number of heart beats and shear forces to the aorta. Observation alone will result in worsening aortic injury and risks immediate death if the aorta ruptures completely.

76 Answer C. The patient has a ring-enhancing lesion seen in the left parietal area on contrast CT scan of the brain. In a patient with HIV, toxoplasmosis, due to the parasite *Toxoplasma gondii*, is the most likely cause. Treatment is with sulfadiazine, pyrimethamine, and adjunctive leucovorin. Corticosteroids may be used as adjunctive therapy in severe cases. Surgical excision is not indicated in toxoplasmosis. Mebendazole is an agent used to treat other parasitic infections. Clindamycin may be used to treat brain abscesses along with surgical drainage. (Figure reprinted with permission from Silverberg M.

Greenberg's text-atlas of emergency medicine. Lippincott Williams & Wilkins; 2004:999.)

- 77 Answer D. The MCP joint and IP joints are constructed differently. In the MCP joint, the metacarpal head acts as a cam, such that the distance between the metacarpal head and the base of the proximal phalanx is greater in flexion than in extension. Therefore, when the MCP joint is extended, the collateral ligaments are relatively flaccid, while they are stretched during flexion. If patients are splinted with the MCP joints in extension, contraction of the collateral ligaments occurs and patients may not be able to fully flex their digits once the splint is removed. In contrast, the IP joint is a hinge joint with two condyles on the proximal phalangeal head. Although some flexion can be used, extension of the IP joints ensures that its collateral ligaments will also be taut.
- 78 Answer E. Activated charcoal prevents absorption of many drugs from all sites in the GI tract. Notable exceptions to the drugs absorbed by activated charcoal are ions, heavy metals, ethanol, and hydrocarbons. Choices A to D all fall into one of these categories, and only acetaminophen is absorbed by activated charcoal.
- 79 Answer A. Liquid drain cleaner usually contains a strong base, such as sodium or potassium hydroxide. The treatment of caustic ingestions is generally supportive and involves diagnosis of severe esophageal burns with endoscopy. Small amounts of water or milk may be taken immediately after the ingestion to wash away the excess caustic material. Large amounts of fluids should never be taken, as this may precipitate vomiting, which will dramatically worsen esophageal injury. Calcium gluconate is indicated in patients with hydrofluoric acid exposure to replace the calcium which is bound by the extremely electronegative fluoride ion. Steroids have not been proved to be beneficial in patients with most caustic injuries, although it may offer some benefit in patients with moderate esophageal injuries. Antibiotics should not be given unless that patient has received steroids or unless there are clear signs of perforation. Neutralization therapy with acid or base should never be pursued, as this will lead to further injury.
- 80 Answer A. Although *C. perfringens* is probably the most common cause of acute food poisoning in the United States, all of the above bacteria may cause food-borne illness. Their classic associations are given below.
- *C. perfringens*: Toxin-mediated, predominantly diarrheal illness that occurs 6 to 12 hours after ingestion and is common in meats, poultry, and gravies. Requires ingestion of live organisms because the toxin is produced *in vivo*. The illness resolves in 24 hours with supportive care.
 - *S. aureus*: Toxin-mediated emetogenic illness that occurs 1 to 6 hours after ingestion. Common in high-protein foods such as ham, eggs, poultry, custard-based pastries as well as potato or egg salads. Symptoms typically resolve within 8 hours without specific treatment.
 - *B. cereus*: Causes two distinct illnesses. First is toxin-mediated illness that results in acute food poisoning, predominantly characterized by vomiting. Very similar to the syndrome caused by *S. aureus* except it almost always occurs after ingestion of fried rice. Second illness is a diarrheal illness almost indistinguishable from the illness caused by *C. perfringens*. As with *C. perfringens*, it is a toxin-mediated event but requires ingestion of live organisms as the toxin is produced *in vivo*.
 - *V. parahaemolyticus* is increasingly a cause of foodborne illness in raw or undercooked fish or shellfish. It causes disease through direct intestinal invasion as well as enterotoxin production and is almost always characterized by explosive watery diarrhea and crampy abdominal pain. Vomiting and bloody stools may occur but are less common.
- 81 Answer D. In septic arthritis, the synovial WBC usually exceeds 50,000 WBC per mm³ and often exceeds 100,000 per mm³, with >75% polymorphonuclear cells. However, patients with gout, pseudogout, and rheumatoid arthritis may also have WBC counts in this range with a similar differential. Therefore, when the WBC is elevated approximately 50,000 per mm³, septic arthritis must be presumed until ruled out.
- 82 Answer C. The patient has evidence of slipped capital femoral epiphysis (SCFE). The most common presenting age is early adolescence, it is more common in boys, and African Americans are the highest risk population. Obesity is the most common associated condition, but hypothyroidism may also be involved. Patients typically present with unilateral or bilateral hip or knee pain, which is intermittent and worse on activity. Physical examination may demonstrate progressive loss of internal rotation, muscle atrophy, and leg length discrepancy. Lateral, AP, and frog-leg radiographs show the femoral epiphysis slipping inferiorly and posteriorly off the femoral neck. Emergency management includes non-weight-bearing and orthopedic consultation.

- 83** Answer B. Postoperative ileus is a common, expected outcome after laparotomy. However, multiple electrolyte abnormalities may also cause or exacerbate the condition. Hypokalemia is the most common electrolyte abnormality responsible for ileus, though hypomagnesemia, hyponatremia, hypocalcemia, and uremia may also contribute.
- 84** Answer B. Any patient with underlying joint disease is more likely to develop septic arthritis. However, patients with underlying rheumatoid arthritis are most likely to develop concurrent septic arthritis. The diagnosis is usually delayed because patients are often afebrile, the presentation is frequently indolent and the symptoms are initially attributed to an exacerbation of the patient's chronic condition. The case-fatality rate is 30% to 50%. Therefore, any patient with an underlying connective tissue or joint disease who develops sudden inflammation in one or two joints should be presumed to have septic arthritis until proved otherwise.
- 85** Answer E. Troponin I is highly specific for cardiac muscle. It starts rising between 3 and 6 hours after infarction, peaks at 12 to 24 hours, and returns to normal within 7 days. The specificity of troponin I is excellent at 6 hours postinfarction, but the sensitivity does not approach 100% until 12 hours.
- 86** Answer B. The primary survey of trauma is intended to diagnose immediate life threats. The simple mnemonic "ABCDE" indicates the appropriate evaluation: Airway, breathing, circulation, disability, and exposure. The airway is considered intact when there is clear, coherent speech and lack of obstruction. The lungs are next examined to assess for evidence of hemothorax, pneumothorax, or flail segments. Pulses in various extremities give a rough estimate of the patient's hemodynamic status. A quick neurologic examination to check for pupillary reactivity, extremity movement, and rectal tone completes the disability portion of the primary survey. Lastly, completely disrobing and turning the patient to expose all body parts will reveal any hidden external injuries. The cardiac and abdominal examinations, though important, are not part of the primary survey because they will rarely reveal life threats that are immediately lethal and treatable. The otic and nasal examinations should only take place in the secondary survey.
- 87** Answer C. The patient has dry socket, or acute alveolar osteitis. It occurs in 5% to 20% of all tooth extractions, and the posterior mandibular teeth are at highest risk. Age, smoking, and poor dental hygiene are strong risk factors. Dry socket is distinguished from normal postextraction pain by the severity, delayed onset, and lack of relief with NSAIDs. Halitosis is almost always present in patients with dry socket. Direct anesthesia, irrigation, and gentle packing are indicated. Treatment may also include NSAIDs and narcotics for pain and penicillin. Recreating a clot is associated with a higher incidence of osteomyelitis.
- 88** Answer C. Endocarditis prophylaxis with antibiotics for patients with prosthetic or damaged valves is recommended for the following procedures: Dental cleaning, rigid bronchoscopy, endoscopic retrograde cholangiopancreatography (ERCP), and cystoscopy.
- 89** Answer B. Ninety percent of anal fissures are located in the posterior midline. The remaining 10% are located in the anterior midline. Fissures located elsewhere should prompt consideration of an underlying disease, such as Crohn's disease, leukemia, HIV infection, tuberculosis, or syphilis.
- 90** Answer E. Recognizable lead points other than Peyer's patches are found in only 2% to 8% of patients. All of the listed choices may serve as lead points in intussusception. However, most cases are thought to occur when an enlarged Peyer's patch telescopes into adjoining bowel. The most common location is ileocolic.
- 91** Answer C. This patient has erythema infectiosum (or fifth disease) caused by parvovirus B19. The illness is common and frequently asymptomatic. In symptomatic children, papules develop on the cheeks which promptly coalesce to form a bright, erythematous plaque which spares the perioral area (circumoral pallor) and nasolabial fold. The rash typically lasts for approximately 4 days. Parvovirus B19 is most important in causing aplastic crises in patients with underlying hemolytic anemias. In addition, infection of nonimmune pregnant women rarely results in fetal hydrops and death. No treatment of immunocompetent individuals is required, though practitioners should determine the immune status of exposed pregnant women. (Figure courtesy of John Loisel, MD. Reprinted with permission from Chung EK. *Visual diagnosis in pediatrics*. Lippincott Williams & Wilkins; 2006:433.)
- 92** Answer B. IVDUs have skin flora that are transmitted through superficial veins into the greater venous circulation to the right heart. These pathogens (usually *S. aureus*) lodge most commonly in the tricuspid valve to cause right-heart endocarditis and may also lead to septic pulmonary emboli.

93 Answer E. This patient has evidence of bilateral facial nerve paresis. Bilateral facial nerve paresis or paralysis is rare in the setting of Bell's palsy and its presence should prompt a search for alternative diagnoses. In general, patients with bilateral facial nerve paresis should be considered to have Lyme disease until proved otherwise. This patient's recent camping trip suggests the possibility of a remote tick bite, which led to infection with the spirochete *Borrelia burgdorferi*. Ten percent of patients with erythema migrans, which is not treated will develop neurologic manifestations, the most common of which is facial nerve palsy. Interestingly, patients with facial nerve paralysis due to Lyme disease typically have other constitutional symptoms or neurologic findings that point toward the diagnosis. Other causes of bilateral facial nerve palsy include myasthenia gravis, lymphoma, sarcoidosis, brainstem tumors, and Guillain-Barré syndrome (GBS).

94 Answer B. Ovarian torsion is relatively uncommon amongst patients in the ED but it is an important cause of acute pelvic pain. The classic history is the development of severe, acute pelvic pain associated with nausea and vomiting. The patient may note that a sudden change in position precipitated the pain. Interestingly, recent reviews have demonstrated that the onset is often much more subtle, with pain lasting from several hours to several weeks and only rarely associated with nausea or vomiting. Torsion is more common in young women with an average age at onset in the mid 20s. In addition, it is much more prevalent in patients with adnexal masses as ovarian tumors are ultimately revealed in approximately 60% of women. Finally, there is an increased rate of torsion in pregnant women, as roughly 20% of cases occur during pregnancy. Owing to obstructed venous drainage, the ovary enlarges and ovarian enlargement is the most common finding. Doppler ovarian imaging is difficult because of the dual ovarian blood supply, which may lead to the false perception of maintained arterial flow. Furthermore, many patients may experience spontaneous and recurrent torsion and detorsion. Ultrasonographies performed with a normal ovarian lie will not reveal vascular abnormalities. Finally, the presence of a large ovarian mass or hemorrhage within the ovary may make detection of vascular flow exceedingly difficult. Abnormal color Doppler imaging is highly predictive of torsion, but 50% of patients with surgically proved torsion have normal Doppler imaging.

95 Answer E. Most patients with inflammatory bowel disease (IBD) (Crohn's disease or ulcerative colitis) who present to the ED have only mild to moderate exacerbations caused by a stoppage of their medicines.

Such patients may be managed as outpatients by resuming their preexisting therapy or by adding corticosteroids if they have been compliant with therapy. Bowel rest has not been shown to be useful and is only required in patients requiring surgery. The initial treatment of fistulae is medical therapy. Toxic megacolon has been classically associated with ulcerative colitis, although Crohn's disease is increasingly recognized as a cause. Initial therapy is generally medical, and includes aggressive intravenous fluids, broad-spectrum antibiotics, parenteral corticosteroids, and decompression (nasogastric tubes, rectal tubes). Surgical treatment is reserved for refractory patients or in cases of perforation.

96 Answer A. Unlike cases of spontaneous bacterial peritonitis (SBP), where gram-negative enteric organisms predominate, patients with peritoneal dialysis catheters tend to develop peritonitis from gram-positive organisms, most commonly, *Staphylococcus* species. Clinical signs and symptoms of infection can be extremely mild and asymptomatic infection is common. Diagnosis is through analysis of the peritoneal fluid—100 or more WBC per mm³ with a predominance of neutrophils or a positive Gram stain makes the diagnosis. Most cases can be treated on an outpatient basis with intraperitoneally administered antibiotics. The antibiotics of choice are vancomycin plus any antibiotic with good gram-negative coverage, such as a fluoroquinolone, third generation cephalosporin, aminoglycoside, or aztreonam.

97 Answer D. Posterior hip dislocations account for 90% of all hip dislocations. The most common mechanism of injury is a "dashboard injury," in which a seated patient strikes the dashboard with a flexed knee, driving the femur posteriorly. Owing to the force required to dislocate the well-protected hip joint, posterior hip dislocations are often associated with multisystem trauma. Patients will present with a shortened leg, with the hip internally rotated, adducted, and slightly flexed. Approximately 10% of posterior hip dislocations are associated with sciatic nerve injury, which is usually a neurapraxia. After reduction, this is manifest by hamstring weakness as well as weakness of all lower leg muscles, loss of ankle reflex, and hypoesthesia of the posterior thigh and complete lower leg. Posterior hip dislocations must be reduced emergently because of the high risk of avascular necrosis of the femoral head. Films should be obtained before reduction to determine the presence of associated femur or pelvis fractures, however, unless a pulse deficit is present. Femoral head fractures are much more common in anterior femoral dislocations, occurring in as many as 77% of

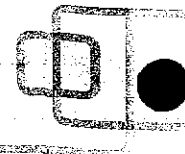
patients versus only 10% of patients with posterior dislocations. Because the femur is internally rotated and adducted, the shadow of the lesser trochanter is not seen on an AP projection. This is one critical tool to help differentiate posterior dislocations from anterior dislocations. Another is to examine the size of the femoral head. Because the posteriorly dislocated femoral head is closer to the x-ray cassette, it often appears smaller than the unaffected femoral head.

98 Answer E. The patient has herpes zoster ophthalmicus. Treatment involves systemic antivirals with topical antivirals and antibiotics as optional adjunctive therapy. Urgent ophthalmologic consultation is generally pursued. Corneal hypoesthesia is common and over three fourths of patients recover completely. Dendrites (with bulbs) are seen in recurrent herpes simplex conjunctivitis rather than herpes zoster conjunctivitis. The ophthalmic division of cranial nerve V is involved. Anterior uveitis occurs often in herpes zoster ophthalmicus and the frequency is independent of severity of corneal involvement.

99 Answer C. This patient has a mononeuropathy of cranial nerve III. In addition, the parasympathetic fibers of the oculomotor nerve seem to be spared. The most likely diagnosis is a diabetic mononeuropathy, which results from microvascular ischemia of a nutrient artery feeding the core of the oculomotor nerve. The peripheral aspect of the nerve, which contains the parasympathetic fibers to the pupil, is less affected because of collateral blood supply. However, a more ominous possibility is an aneurysm

of the posterior communicating artery ([PCOM] aneurysm). The oculomotor nerve exits the brainstem between the PCOM and the superior cerebellar artery, so a PCOM aneurysm is well positioned to impinge on the nerve as it exits the brain. However, compression of the nerve usually affects the pupils as well, resulting in anisocoria. In addition to a PCOM aneurysm, it is important to evaluate the brainstem for signs of ischemia (vertebrobasilar insufficiency) as well as ischemic or hemorrhagic infarction. These findings may not be picked up on a routine CT scan of the brain. Although a cerebral angiogram would be useful for diagnosing an aneurysm, it is more invasive and provides less information about the brainstem than an MRI.

100 Answer A. *E. coli* is isolated in 47% to 55% of the cases of spontaneous bacterial peritonitis (SBP) and gram-negative organisms are the most common etiologic agents as a group. *K. pneumoniae* is the second most commonly isolated organism. This is followed by *S. pneumoniae*, and other *Streptococcus* and *Staphylococcus* species. Although there have been isolated reports of anaerobic and polymicrobial infections in SBP, they are generally not considered to be causes of SBP. Fever or abdominal pain in a patient with ascites should raise the suspicion of infection and prompt a paracentesis. The presentation of SBP may be subtle, however, and include only mental status changes without abdominal pain or tenderness upon examination. All patients with an ascitic fluid neutrophil count ≥ 250 per mm^3 and a clinical picture consistent with infection should be treated with antibiotic therapy.



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